Future land action

MINISTÈRE DE LA DÉFENSE

Armée de Terre

>> **Lessons learned**   *The US digitization in Afghanistan*

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THE US VERSION IS A MILITARY TRANSLATION FOR ENGLISH-SPEAKING READERS**

editorial

In line with the spirit of the transformation of our review, the reflection on the consequences of battlefield digitalization and on the fielding of new equipment by 2008/2010 carried out since nearly three years by the Army's doctrine community (*in particular the CDES, the Land Forces Command, the Land Logistic Forces Command and the Prospective and Studies Directorates of our branch schools*) fall naturally within the scope of this publication.

This is the reason why this first issue of our new general military review "Doctrine" has to be the one presenting the "*future land action*" study.

This multi-annual study, a priority for the evolution of the land forces' employment and organization by 2010, contributes to the Army Staff prospective steps carried out within the framework of PP30 (prospective plan for the next thirty years). But its purpose is concrete ; the matter is to take into account the effects of digitalization that are already effective. These ones are still starting to provide forces with tools that enable them to maneuver more quickly, i.e. to better combine their actions within space and time, and especially the effects of their weapon systems. It is thus advisable to well prepare the immediate future as soon as possible, while having for the employment and organization of our forces a progressive doctrine adapted to the new overall context and to the new equipment fielded within 2015. But we also have to be able, as upstream as possible, to train and educate military and civilian personnel. All of this has to be carried out in close synergy with the development and testing of battlespace digitalization (NEB).

Thus, through successive steps, the French future land action study (ATF) will describe our vision of the future doctrine for employing and organizing our land forces by 2007/2010. While taking into account our allies' innovative ideas especially the American ones- but adapted to our national policy and therefore to our needs and military culture, the ATF study is set within the prospect for "*future land commitments*" by 2025/2030, and integrates the first results of our forces' digitalization but also all the known conceptual or doctrinal reflections -official or not - for the employment and organization of our forces such as the test carried out by the CDES/CREDAT in 2000 with the "vector maneuver" or the more and more numerous writings of Army officers as well as all lessons learned from exercises and operations (RETEX).

From now on, this study - with an update included in this issue - is carried out within the framework of the studies agreed during the June 2003 executive management committee for operational studies (CODIROPS), but also within the framework of the work initiated by the experience feedbacks resulting from the last operations (ARTEMIS, UNICORN, IRAQ).
Armed with this important doctrinal reflection carried out by many working groups, this study should cope with a more experimental phase - at technical and tactical levels - in 2004.

Thus a new doctrine - but also a new military culture - is gradually arising from reflection and action, with the participation and support of everyone, implementing the same rules for employment and organization, based on the actual fielded means and equipment.

Major General Gérard BEZACIER
Director of the "Doctrine" review

"The transformation"

This title intends to reveal the innovative and resolutely determined new spirit which from now on rules the land forces " *Doctrine* " community. Beyond the new title and presentation of the new Army " *Doctrine* " publication, we are in fact facing a significant evolution in our environment. That explains the establishment of a center in charge of the employment doctrine of the land forces[1], placed directly under the authority of the Army Chief of Staff, to begin on July 1st 2004, when the CDES[2] will disappear. Why such an evolution, however perfectly in line with the sustained doctrinal effort of the Army actors' community : regiments and staffs, military academies and branch schools, specialized centers of the central administration and of the various civilian and military organizations within the land forces ?

Because from now on it is obviously clear that we are involved in a long term process to adapt and to modernize our defense tool, and that will greatly impact on all doctrinal studies.
Indeed, taking advantage of an already firmly established doctrinal basis, alike the USA and our major European allies we are confronted with the evolution of our forces' employment framework.
The French land forces cannot disregard such a heavy process initiated by the US because of a new strategic context and such a decisive one " *to keep the Army within the leading group of the European land forces while based on the progressive development of a multinational culture* "
(Chief of the Army Staff - Army 2008).

BY Major General Gérard **BEZACIER**

A new forces employment framework

The evolution of the general environment of forces is continuously changing. The direct threat to the borders has been replaced by an increasing number of crisis the causes of which are varied, multiple, and deep. Some states have lost or do lose control over their home territory so favoring the spread of criminal organizations and of terrorism, which from now on get an international dimension. All weapons are proliferating to include the most sophisticated and mass destruction ones.

The technological " gap " with the Western States (Including Japan) and more particularly with the United States generates, within this new context, some types of engagements in which **the adversary takes advantage of all opportunities induced by asymmetry, one characteristic of which is to turn the factors of power into vulnerability points.**

In view of these new threats, the European countries do organize their security within the framework of alliances and of international organizations on a world scene dominated by the " *absolute* " power of the United States. **The combined nature of operations is predominating, because the building up of coalitions is getting unavoidable, would it be only for action legitimacy reasons.** The globalization of exchanges of all kinds, the emergence of supranational entities, and the global interdependence of interests question the very notion of borders as well as the conquest of territories. Consequently, internal and international security are closely linked. Henceforth prevention is at the very heart of the defense dispositions.
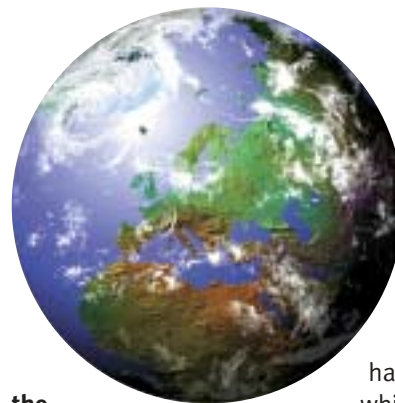
In addition, during these last years, the many operations that we have carried out or in which we have been participating as well as the observation of the last Gulf War, have highlighted some capabilities gaps that urgently required to be filled : **strategic lift, (in depth) fire support into air-sea and air space, short loop targeting, interoperability, special forces employment, and, of course, information mastering as well as protection.**

There is no choice but to note the eminently joint nature of those capabilities. **However an even more complex aspect is now emerging and this one is interdepartmental.** If this one is indeed structural in home operations, it is obvious during overseas operations, through the systematic civilian-military aspect which central role is no more to be stressed.

If the caricature of the three constituting blocks of an operation are finally accepted: intervention, stabilization, and normalization, and if it is clearly understood that the force coercion and violence control operating modes are not opposing, but rather complementing each other (it is indeed not possible to control violence without showing and demonstrating a coercion capability !), the significance of the stabilization phase then shows its full relevance. It is the one that clears the way either to political success and appeasement or the one that cancel any victory and military superiority.

This key phase, in which land forces play a major part, should then be carefully planned and prepared, well ahead of the intervention and of the (actual or virtual) battle.

The political, diplomatic, economic, legal, and military interaction is a fact that requires a global process through developing an enhanced coordination and a real effort to bring together the "*philosophies*" between the civil and military parties.

Commission européenne

An US approach taken over by the major European partners

In view of these changes and of these lessons, the US have initiated a process for transforming and adapting their defense tool known as "*transformation*".

This process is now spreading within the Allies. New concepts are being designed. NATO is undergoing a drastic change. This one is achieved through an evolution of the Alliance command structure and through the adoption of the "**Crisis Response Operations - CRO**", "**High Readiness Force - HRF**", and "**NATO Response Force - NRF**" concepts and through the definition of "**Prior Capacities of Commitment -** PCC".

The Alliance precautionary principle together with its investment in the civil aspect of the crises complement the transformation. Germany and Great Britain, paying great attention to NATO, have adopted the American approach. Their views are quite close to the US ones, as much in the strategic

analysis as for the changes to be accepted. **France, in view of her strategic ambitions and duties, cannot stand apart.**

The adaptation of the forces is set in terms of interoperability with the Allies likely to assume responsibilities or at least to take an active part in crisis management (*lead-Nation notion*). What is at stake is most important, as the matter is to be in a position to negotiate an active and visible role in crisis management and to retain an influence capability. The goal is to maintain a "*first in*" capability as the French forces are interoperable and fully reactive. Still having the will to take in charge a lead-Nation role, France supports the NATO transformation in view of an improved reaction capability and of renewed capacities.

While favoring the European framework of the EU that she considers as complementary and not redundant with the NATO one, she is activating an HRF army corps (1st corps - at Lille, 2006) and intends to participate in the command structure of the

Alliance and of the European Union for crisis management.

An already initiated transformation the modalities of which are inspired by the US

Aimed at preserving the defense tool pre-eminence, the transformation initiated by the United States is a "*continuous and active*" development and integration process of innovative concepts, doctrines, and capabilities designed to enhance the forces effectiveness and interoperability.

The implementation of this process results in a number of steps and concepts. A major command is in charge with this modernization, it is the "*Joint-Force Command*", based at Norfolk. It is responsible for working out concepts and for leading the process. "*Joint Vision 2020*", "*Network Centric Warfare - NCW*", "*Effects Based Operation - EBO*", and "*Rapid Decisive Operation - RDO*" all are included concepts.

Furthermore, JFCOM has initiated a process named "*Concept Development and Experimentation - CDE*" based on experimenting the above concepts, in order to enhance the existing capabilities and to work out the future ones as required by the new forces employment framework.

The multinational part of the CDE process is expressed through the organization of four multinational experimental exercises. Those exercises are aimed at experimenting

new concepts in a coalition environment, through planning and conducting an NRF deployment. The approach is mainly based on the wanted effects onto the enemy power factors named **DIME** (" *Diplomatic, Information, Military, and Economic* ").

At the instigation of the United States, our major European partners are similarly engaged into the transformation, within NATO as well as within the EU framework.

This approach is expressed through the multinational aspect of the American transformation, the " **Multinational Interoperability Council - MIC** ". The **MIC** is a real interoperability forum for those nations[3] willing to play a major role within coalitions. In particular the information sharing issue is discussed there. In 2004, France will be involved in the exercise *"Multinational Experiment 3 (MNE 3) "*, so joining, in the **CDE** approach, Germany and Britain that have already been participating in both previous exercises. This participation complements the French commitment in the evolution of the NATO structures with the NRF and the HRF 1st Corps.

This step, which guarantees our chances to take part in engagements, in training, and in the thinking process about the transformation, is also materialized within the European framework. The " *European Capability Action Plan - ECAP* ", within which the future armament, research, and capabilities agency is formalizing the definition process of capabilities and of interoperability, is

designed to find out solutions to the European capacity gaps. Working groups, with a French participation, are set up for each operational aspect of the engagement (France, in particular, is managing those about space capabilities and UAVs).

According to this description fundamentally new to our armed forces, the necessity of doctrinal thoughts for the future are obvious : the joint, combined and interdepartmental doctrinal thinking is the main line.

Because of the joint, combined, and interdepartmental nature of our commitments, that should certainly be open ed to civilian and industrial agencies, it clearly appears that no study about forces employment could avoid those prospects. The land forces cannot content themselves with keeping in pace with the evolution of a doctrine corpus through the CDE work and C3 structures, as monitored by the General Staff.

They must at best anticipate, at least accompany, as far as they are now the only ones to have a significant capability for doctrinal thinking, under the direct authority of the CEMAT[4]. In this way the CDEFT[5] will fully supplement the creation of a joint Center for doctrine and concepts the vocation of which is to put a lot into matters of a recognized pertinence : information operations, crisis exit (" *first out* "), use of force, CIS interoperability, operational contract... these studies listed on the

General Staff's agenda for 2004 are generally linked to those carried out by the CDEFT and by bodies or cells in charge with doctrine in the other Services.

If the dictionary is right when defining synergy as a coordinated action of various factors concurring to a single action, a single effect ; then synergy is essential among the doctrine centers of the armed forces and with the future joint doctrine center to ensure the " succés des armes de la France"[6].

Doctrine work should then be carried out within a network beyond the French and Allied Forces' normal area of responsibilities by integrating the civil ones. Each Service center, in close relation with its allied counterparts, as well as every civil and/or military agency will be in charge of a nodal point both irradiated and irradiating, taking the lead according to circumstances and to actions' parameters, or even according to the phases of these ones. The joint center's **art** will really stand in its ability to appreciate and to activate the right connections.

However the goal is clear, the matter is really to avoid redundancy in research and to achieve the integration of joint level thoughts into the Army doctrine manuals. Really the matter is, for the CDEFT officers, to be closely associated to the work and to the fundamental thoughts developed at joint level about what is at stake in force commitment.

Obviously, to properly meet the expectations of the joint center, it will be necessary that, quite soon, the land forces think about the sharing of tasks dealing with concept, doctrine, and preparation of the future, to include tasks linked to tactical and technical experimentations. Indeed, from now on, any operational study laid down at the CODIROPS[7] will have to be carried out, **more than ever**, through the joint doctrine prism and to be directly consistent with the concepts worked out by the general staff. The whole doctrine thinking of the land forces should be immersed in the context governing the transformation and in the directions decided and issued to carry it out. **Henceforth it is a cardinal point.**

Let us be clear and resolutely optimistic, all of this has already started and the transformation process of our armed forces, of the COS and of the DRM[8] is already expressed through a proliferation of projects and achievements that are not to be listed there. However it is necessary to be aware of the most important and essential ones, because they underline how active our forces are to open the road to transformation.

Thus, the joint policy for information systems interoperability aims at the consistency of programs and at the sharing of common services (directories, videoconference, mail, and databases).

The experimentation plan for the acquisition of C3I capabilities will make possible a networking of the training and experimentation centers within the French armed forces and later with the allied ones.

The reorganization of the CPCO (*Center for Planning & Conduct of Operations*) and of the EMFE.IA (*Joint Staff for Forces training*) to respectively activate one strategic command structure : one OHQ (*Operational HQ*) and one (*J*)TFHQ (*Joint Task Force HQ*) meets the need of being able to shift without any break and with reversibility from a state of crisis to a planning one. The same is true of the setting up of a mirror command for each Service, such as the Air Force Operational Staff (EMO).

1 CDEFT: Centre de la Doctrine d'Emploi des Forces Terrestres i.e. Center for Land Forces Doctrine

2 CDES: Commandement de la Doctrine et de l'Enseignement militaire Supérieur de l'armée de terre - Army Doctrine and Higher Military Education Command.

3 United States of America, Canada, Australia, Germany, Great Britain, and France.

4 Army Chief of Staff.

5 Cf. note 1.

6 Translator's note: extract from a sentence officially used in any command hand-over ceremony. Meaning : ″success of the French armed forces ″.

7 Translator's note: operational studies direction committee.

8 Translator's note : Military Intelligence Directorate.

9 Translator's note : Combined arms Combat Simulation for an Interactive Preparation of Operations.

By the end, after weighing the new prevailing environment set to the employment of land forces, after having considered the significance of the change carried out by our American friends, after having analyzed and depicted the current process (es), a decision from the Army Chief of Staff was necessary, as adviser to the Chief of the General joint Staff in matter of land forces employment and as the responsible for units' operational readiness, to place under his direct authority the bodies in charge with the development of the land forces employment doctrine and organization.

This new organization is complementary to the building-up of the HRF 1st Corps by the year 2006, and to the advances in matter of CIS concerning digital modeling of the battle space, in particular with the development of training programs such as SCIPIO.[9]

Update about the "Future Land Action" study

The "Future Land Action" study is a long-term study, including successive stages and numerous iterations. The first mandate, entrusted to CDES by the CODIROPS[1] for the 2001-2002 cycle, aimed at having an update of the current situation, at federating the conclusions of various works (national and international) and at proposing a broad outline of what should be the future land action by 2007. All this has been conducted over a period of one year, with the participation of all the Army's major commands and organizations among which the various Branch Schools, mainly by means of seminars, completed by documentary studies and brainstorming meetings. The report has been distributed in September 2002. It deals with the engagement of a digitized operational land force at brigade level. It is organized around the generic brigade field manual. Its general tone, affirmative and eager, was aiming at shaking some convictions and at being a starting point rather than a doctrine document. As a follow-up to the previous one, the 2002-2003 mandate aimed at considering new courses of action. The methodology does not change. The domains of studies however widen. The force environment, the tactical commander's need for information (*different from Intel*), the effects on Command and Control leading to an adaptation of the Command Posts organisation and to the dissociation of conception-coordination from the conduct of actions have been tackled.

BY COLONEL JEAN-JACQUES LECLERC, CHIEF OF THE CREDAT ORGANIZATION OFFICE (1999-2003)

Splitting the objectives in two

In the course of the coming cycle (2003-2004) the Future Land Action's objectives will be split in two :

- on the one hand the conceptual studies will go on, in particular those related to logistics and cultural background, starting right from the initial training.

- The development of the first true doctrine tools, as appendices to the current manuals, at brigade level and below, for each of the operational functions, and adapted to the available equipment. The horizon is the one of the 2003-2008

military finance law for equipment and it aims at providing the Army with two digitized brigades operational by the year 2007.

The rule "a doctrine for the forces and within the forces" is applied. Progressively and simultaneously to the equipment fielding, the Future Land Action will be enriched in an iterative and pragmatic way through an experimentation-validation process. In addition to the participation of the CFAT and CFLT HQs, the Land Force Component is closely associated to the process through the participation of two brigades (*the 2nd Armoured Brigade and the 6th Light Armoured Brigade*) plus the EMF1[2] (*TF HQ*); it will also be supported by the Forces Preparation Centre and will benefit from the STAT (*Army Technical Development Agency*) and CDES/CROSAT scientific support. The tactical-operational experimentation "GTIA XL" during the fourth quarter 2003 at brigade level, was supported by the SICF, SIR and ATLAS assets, and conceived in cooperation with all the actors listed above as well as with the branch schools directorates for studies and prospective. It should bring the first tangible conclusions, at least through the drafting of Headquarters operating manuals.

This example shows that, at doctrinal level, the battlefield digitization is managed within a comprehensive framework.

Some major ideas

The studies carried out since 2001 made possible to draft a series of conclusions, the main points of which being :

- it is not a question of forgetting everything from the past but to adapt what was being done yesterday to the tools of to-morrow. Courses of action evolve because the know-how sequence which constitutes them is not always the same one,

WITH AND FOR FORCES
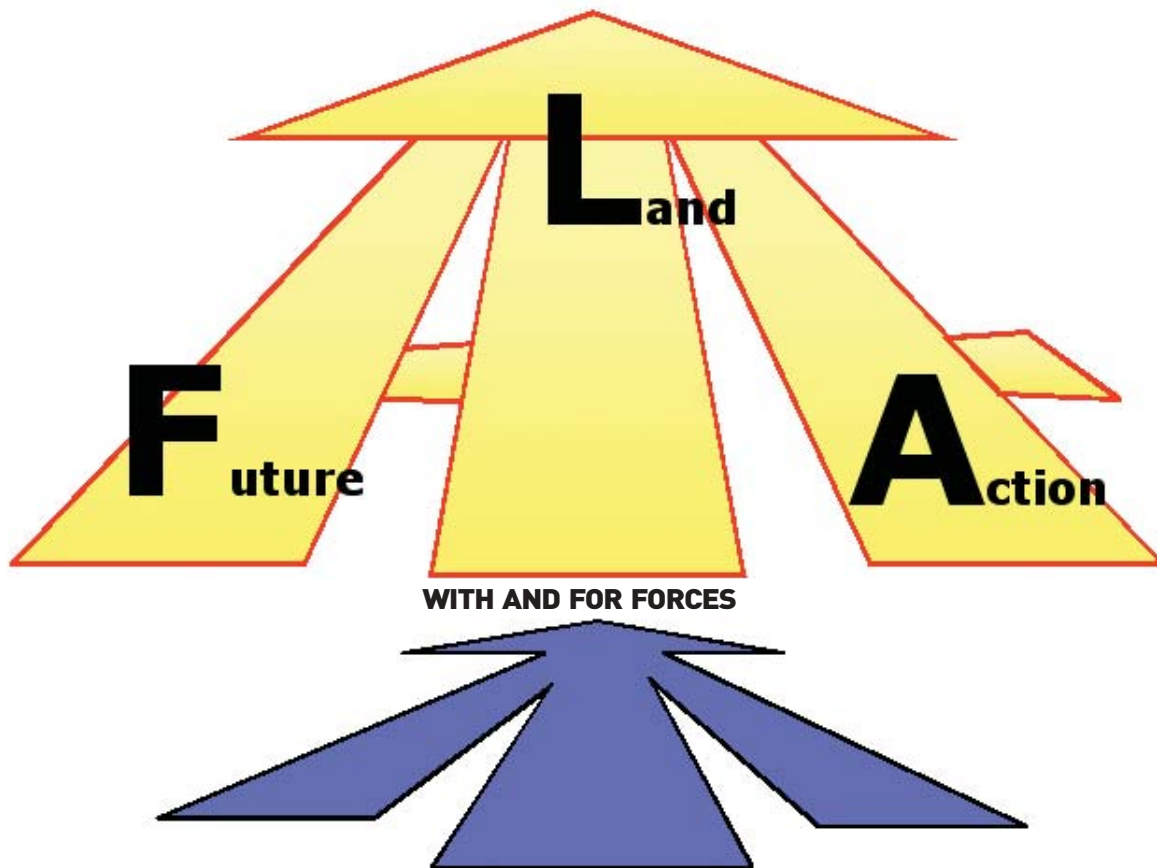
- looking for surprise will have to become a permanent complement to the 3 principles of war,

- if, on the ground, units have to be more and more committed into discontinuous areas, their engagement will require from the chain of command a greater information mastering and a perfect coordination of the actions,

- digitization is not a goal in itself. During more several years, doctrine should still allow the employment of non digitized forces and continue to make use of downgraded modes within the framework of safeguard measures or countermeasures,

- information superiority is not worth anything in itself, if it is not associated to decisional superiority. Finally, it is only the action on the ground that can actualize these two superiorities,

- " *over information* " is an issue which arises today because information is still too much linked to the message handling organisation. The true risk comes from the potential non-exploitation of a vital piece of information, this is why a of follow-up of the information exploitation system will have to be implemented within each Operation Centre,

- these ones will evolve and become lighter which will enable them to demonstrate a better reactivity and an improved mobility,

- in order to deal with any unforeseen event among which enemy's low blows (*never to be underestimated*), it will be necessary to keep a " tactical reserve ",

- man will remain the very heart of the land weapon system. Subsidiarity[3], clarified by the spirit of the mission, will be permanent and will have to be accepted by the senior level as well as by the subordinate one. Both having to be prepared for those types of situation.

1 Operational studies senior committee, following the COCOOPS (coordinating committee) proposals
2 Force Staff #1
3 Subsidiarity is the principle according to which a task is treated by the higher level only if the subordinate level cannot assume it by itself
4 CIS systems (SICF, ATLAS, SIR, MARTHA), combat weapons systems (Leclerc MBT, Tigre Helicopter, Felin system, …) some procedures already exist (RDII = CSIR) or can be adapted.

As a conclusion, tomorrow's doctrine is already on the move, equipment is still fielded or about to be fielded[4]. The true problem, the true challenge is in fact the cultural adaptation. It is necessary to dissociate oneself from too peremptory certainty, from too well known schemes and to accept the evolutions.

The Future Land Action doctrine will be what the Army wants to do of it. To that end, willingness, discipline and courage will be necessary.

Fighting
in vacuum areas

The recent environments for our forces' commitments, in particular in Afghanistan, the contribution of new information technologies, the accuracy and efficiency improvements of our weapon systems as well as our armed forces' downsizing partially question the forces' commitment doctrine resulting from high intensity coercion warfare with linear dispositions of forces and facing a symmetrical enemy. Actually the concepts of linear lay-outs and continuous fronts are no longer relevant and they have to be abandoned or at least not to be considered any longer as the only possible disposition. Indeed, we have to recognize today that commitments will be more and more often carried out in vacuum areas, i.e. the ones offering gaps between the dispositions. Consequently, within the framework of a commitment, we will have to use these " *vacuum areas* " detected in the enemy's posture as those created within our disposition by tactical or material requirement.

BY GENERAL PHILIPPE VOUTE, CHIEF OF CDES/CREDAT 2001-2003

Based on the reasons which led to this concept of vacuum areas, we intend in this article to outline the consequences of such an environment on the maneuver at tactical level both in terms of organization as of equipment and command and control.

Since the fall of the Warsaw Pact, Western European countries no longer have to fight for their survival. Their armed forces - most of them becoming all-volunteer and downsized ones - are now " *expeditionary forces* ", which cannot hold the whole of the terrain on which they are committed.

The potential enemy also has only limited forces both in capabilities and strength. Inevitably this leads to a new tactical deal, which is primarily characterized by the dropping of linear postures and continuous fronts that are replaced by more spaced out dispositions with a widening of intervals between units carrying out the same operation or taking part in the same maneuver. Thus the reduced strength of the force will compel the commander to deploy its disposition only in areas considered as most important and by giving up others considered to be less essential for the operation.

Moreover, because of the power and accuracy of new weapon systems, it becomes even more imperative than in the past to avoid too vulnerable force concentrations. Under these conditions, the maneuver, which was so predictable and frozen when facing the " *Soviet road roller* ", is recovering all its primacy and importance.

First of all, the dispersion of units will make possible to bring up to date some somewhat forgotten procedures, such as deception maneuvers, which can then be all the more easily carried out as loose dispositions allow to keep more longer the enemy into uncertainty and to hardly reveal the application pointof the main effort.

Counter-attacks and reactions to unforeseen events require a force reserve not dedicated for carrying out the main effort and immediately available. Moreover, this reserve should permit to take advantage of a specific opportunity (*contingency operations*) in order to give a bad blow to the enemy. Empty areas left between units provide excellent possibilities to cross dispositions, to infiltrate

and to carry out raids combining armored and airmobile components, and thus to take advantage of the surprise effect in order to reach significant enemy key points in the depth. These actions will only be possible if the commander has accurate and very recent information. For this purpose, the BRM - Multisensor Information Battalion - with its assets will provide in real time the SORA system with inputs, which will merge all pieces of information, among which those coming from units in contact with the enemy.

Moreover, this maneuver's revival takes advantage of the contribution of equipment under development or being fielded, resulting from the most advanced technologies as regards Control and Information Systems (CIS) as well as weapon systems. Maneuver changes and new equipment will naturally imply a reorganization of Ops Centers in order to accelerate in a significant way the decision-making process and to optimize the new possibilities granted by these vacuum areas and new weapon systems. Among others, the commander should be able to count and rely on a reference tactical situation as well as on reactive structures and procedures in order to succeed in exploiting all opportunities, which will be more considerable in a disposition with empty areas. Similarly, the MEDO method will have to be entirely reviewed in order to be able to manage these contingency operations.

Through battle space digitalization, the commander will acquire a true informational superiority, ensuring his freedom of action, and thus giving him the possibility to anticipate the enemy action in very short delays. Within this context, vacuum areas will then enable the commander to develop original maneuvers, and combat procedures adapted to this new environment, while relying on reactive, swift and protected systems available to the force (LECLERC MBT, TIGER...). This concept of vacuum area warfare has become a fact and it will not be possible in future doctrines to ignore it. Our allies have also taken this new deal into account. But is this concept so new ? Didn't Napoleon and all major commanders already operate within an vacuum area environment ?

In any event, the development of new technological means will provide us with new - even unsuspected - possibilities to exploit enemy weak points. We will not only have to use these technical improvements advisedly but we will also have to question the sequence of know-how and our way of maneuvering.

**The development of new technological means :
we will have to question our way of maneuvering.**

Guillaume GRANDIN/ECPAd

Looking for a "Maneuvering state of mind"

"Inside the two staffs, boldness was not equally distributed". This observation made by Hélie de Saint Marc[1] illustrates the difference in the states of mind which existed between the German staff and its French counterpart before WW II, the "BLITZKRIEG" being the immediate illustration of this difference.

After forty years of cold war, and the development of armed forces and maneuvers based on power, strength and the opponent's destruction through a brutal confrontation, the situation has dramatically changed. For the coming decade, the foreseeable evolutions within the land formations in terms of capabilities as well as in terms of engagement offer the opportunity to give back credibility to a maneuvering state of mind. During the ten coming years, the land forces will see very important changes as far as capabilities are concerned. In parallel, the possible framework of their engagements will continue to widen. That's why, the underlying spirit itself behind their employment will have to evolve too.

BY LIEUTENANT-COLONEL HERVÉ AURIAULT, CHIEF OF THE CREDAT FUTUR CELL

The Army units' equipment has always been replaced on a regular basis. However, the tools expected during this decade constitute more a revolution that a mere evolution.

In the course of the next ten years, most of the land forces' equipment will have been replaced. The vectors' stealth ness, i.e. their capability to escape detection and consequently destruction by the enemy, will not have anything in common with what exists today. Benefiting from a permanent geographical positioning system, high speed navigation will not be a concern any more.

Moreover, their trajectory will be visualized by the crew on a tri-dimensional cartography system. The battlefield digitization, a sort of tactical Intranet which is already partly fielded, will speed up the

The power and above all the accuracy of a great number of weapon systems will allow a significant increase of the Force firepower.

data transmission from the bottom to the top as well as from the top to the bottom. A reference tactical situation will enable all levels, each one at its scale, to visualize the friendly positions as well as the localized enemy ones. The power and above all the accuracy of a great number of weapon systems[2] will allow a significant increase of the Force firepower. The Army units' possibilities of action will not only be largely increased thanks to the use of new

technologies, but moreover their framework of engagement will change in such a way that it will directly influence their employment possibilities.

Until yesterday, the committed forces were facing each other. The dispositions of forces, roughly linear and continuous, did not permit to demonstrate much originality. Shock was frontal. It was a question of destroying enemy units in contact. Usually, the manoeuvre consisted in alternating defensive and offensive phases, mainly by concentrating efforts through an accumulation of assets. Thus, the manoeuvre was very processional, moving successively from one phase to the other while avoiding simultaneous actions too difficult to coordinate.
There is a great difference between the current and the future engagement framework.
The Armies' strength has been already significantly reduced. The units' linear positioning, almost shoulder to shoulder, has now become history. The lay outs are more open. It is now a matter of holding terrain key points.
The goal is to master the environment and, due to the lack of assets, not anymore to control it physically and entirely. This entails the creation of gaps and empty areas.

Under these conditions, it is essential to wonder about some possible evolutions in the domain of forces employment.
The mandate given to the working group dealing with "*Future Land Action*" consists in conducting

these reflections in order to anticipate all these changes for the benefit of the "*maneuvering state of mind*" revival. Military victory pass through the information battle. The goal is to obtain informational superiority in order to ensure the decisional superiority to the benefit of action optimization.

Right from the beginning, the goal is to exercise ascendancy over the opponent in terms of awareness and knowledge, i.e. to be able to grasp the overall tactical situation earlier and more comprehensively than him. Starting from a total, automatic, immediate and globally permanent duplication of the friendly lay out as well as of the enemy known elements, it is now a matter of "*balancing*" carefully the nature and the volume of forces to be involved in the contact battle in order to favor actions using soundly all the array of operational functions, in view of the sought effect, according to the principle of "*foudroyance*"[3].

The warfare principles are still fully relevant. They are even reinforced by new possibilities : stealthness, reactivity, global information, and reference situation which allow, in particular, to favor the surprise factor.
The objective is to permanently keep the initiative or to retake it as soon as possible, when necessary. New possibilities are then offered to the one who is ready to make use of them, and who is able to get rid of too (*much*) well-known sketches, should the opportunity occurs.

The maneuvre, the will to use trickery, to mislead the enemy, to demonstrate flexibility, to strike where and when the enemy does not expect it, is, above all, a question of state of mind. It is necessary, in spite of cultural habits, to question what was always done, whereas the daily experience demonstrates, if need be, that the overall situation has basically changed.

Whatever the force ratio, it is now a question of not accepting the opponent's ruling in order to be able to keep an aggressive or even offensive attitude. We must permanently be in a "*weak to the strong*" state of mind, and never underestimate one's opponent. Current know-how still remain but their sequencing in time and

space changes. Thus, if the tactical situation allows it, in addition to the main action, some possible contingency operations, specific and brutal - like tactical targeting -, can be carried out against selected or contingency targets.

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1 ˝Notre Histoire, 1922-1945 ˝; Hélie de Saint Marc, August von Kageneck; page 154.
2 The LECLERC MBT, the TIGER helicopter, the 52 Calibre gun, the optical fiber guided missile... etc...
3 The purpose of the principle of foudroyance (or lightning effect) is not to destroy everything, which presents no interest in any conflict, but to break the other's rhythm or rhythms in its various activities, in order to prevent it from recovering and to delay it permanently in the action. (Admiral LABOUERIE ˝Strategy, reflexions and variations˝).

The maneuver is becoming more flexible. The vectors trajectories are not any more mono-directional. Everything is done in order to maintain some flimsiness feeling so that the enemy cannot perceive where, when and with which means we will strike it. The goal is to obtain a mass effect, not through the concentration of assets but through the concentration of all types of effects, coordinated by a specialized cell of the Ops centre. At all levels, work is primarily carried out in a cooperative way. The maneuver design is carried out by the higher level in direct liaison with the concerned command level while this one is conducting the action.

The forward committed units may benefit from the mission preparation that has been carried out in the rear. Indeed, these elements of reflection find all their relevance within the framework of symmetrical or even dissymmetrical conflicts. It is thus necessary to notice that the most recent situations favor asymmetrical situations and operations in difficult areas, especially because the potential opponents have already adapted their tactics to their deficiencies in matters of capabilities. The answer is thus not only technologic ; it is, above all, cultural. Why not taking advantage of it ?

The command and control function by the year 2010

June 2010, night is falling somewhere in the vicinity of a built up area in a Central Asia steppe …
The reduced (size) CP is silently busy around its SICF V3 terminals and the command group is
finalizing his operational plan (OPLAN) around the " *bird table* " (the famous digitized flat map,
interoperable with the SICF system and procured on the shelves since the year 2006)…
Simultaneously, appearing suddenly from nowhere, the " Leclerc " formations converge towards
their objective without any break while the new tactical situation is automatically displayed
on the screens of the tank commanders sure to be guided by the navigation system which
is now connected to the European satellite network …
Infantrymen, equipped with the Félin[1] system, have already reached their positions and
the platoon leaders check for the last time the enemy elements on the screens of their tactical
information system, thanks to a discrete data transmission performed by the last generation
of PR4G[2]. Since the years 2000, the manpower of the CP has been cut down by half, but the
operation order (OPORD) - which is now essentially based on sketches - will be displayed
in record time on the monitors of the subordinate formations thanks to the dazzling progress
of digitization… However, in a few hours, the combined arms taskforces will have to dash into
combat in the suburbs where, as colonel Pétain wrote, " *fire continues to kill* " …

BY **COL Eric ROUSSEL, CREDAT (French realisation and doctrine studies center)**

New procedures have been defined to increase the speed of data transmission.

ECPAd

CP organization

In 2010, the force C2 is adapted in order to be faster than the opponent and to act in due time, by accelerating the decision making process and the execution of actions. It is also more accurate to strike at the appropriate location (*tactical targeting*), more present at the heart of engagements, and more efficient in the long term. The command and control system encompasses the force CP, the GTIA[3] CPs and some TF sub-groups CPs within a true digitized network. The force CP system is in accordance with its subordination level, its multinational nature and with the units placed under its authority.
Its trimming has been seeked in order to increase its tactical efficiency, to improve its survivability and reactivity to the frequent changes in the situation. Updated and permanently available on the " *operational intranet* " of the force, the reference tactical picture enables each authority to know both the situation interesting his level and the required information to answer his needs (conception, conduct, execution, implementation). It minimizes the inherent frictions pertaining to the engagement but without suppressing them.

ECPAd

The use of sketch orders is favored

The procedures are improving

New procedures have been defined to increase the speed of data transmission. In 2003, the upwards transmission of information is normally carried out thanks to successive syntheses. But digitization allows to establish short loops to shorten delays.

The decision making process is schematically divided as follows : acquisition of an event - transmission - exploitation - conception - decision - drafting of orders - transmission - exploitation - action. The use of sketch orders is favored. They are in accordance with the reference tactical picture.

Command style adapts itself

The digitization appropriation by man for managing men's organization has been achieved in order to optimize technological innovations and to master new procedures. Commanders and subordinates are able to " *win thanks to information* " without having lost their qualities of courage, discipline, and initiative which where characterizing them before the digitization of the force.

The importance given to a human command, the necessity for commanders to be " *seen* " and to expose themselves to preserve the

combatant's morale are still remaining.
All of them master new know-how. The update and the access to the databases have taken a significant place in the daily activities of a staff officer. Able to carry out rapid syntheses, they perfectly master the use of graphical orders, comply with computer information security measures, and use applications that compute force ratios with the right parameters or prepare tactical moves.

The command and control teams of the GTIAs are facing utmost difficulties. These ones are coming from the physical proximity of the opponent and from their subsequent frictions. They are also coming from over-information and entryism resulting from a flattening of the hierarchical levels likely to occur at any time and which may lead to paralyze that level.

1 FELIN : Fantassin à Equipement et Liaison Intégrés. (Infantrymen with Integrated Equipment and Liaisons).

2 PR4G : Poste de Radio 4e Génération. (4th Generation Radio Set).
3 GTIA : Groupement Tactique InterArmes. (Combined Arms Taskforces).

The organization of a force OPS center by the year 2010

As a preamble to any reflection about the command and control of a force by the year 2010, it seems necessary to define its scope and limits.
Which force is in question ? The aim is definitely to consider the tactical level i.e. the one of a Land operational force (FOT) the volume of which can range from a combined arms brigade to an army corps, through the division size. A first remark is necessary on that topic : If, with the Task force HQ concept, the Army has made a considerable innovation and is more and more discovering everyday the flexibility and the potentialities of the operational employment of that command entity, it is likely that this is only the first step of a more important process which, later, may question the traditional field command organization corresponding to that hierarchical organization which leads from the brigade to the army corps, even to the field army.

BY LIEUTENANT GENERAL JEAN-CLAUDE THOMANN, COMMANDING THE LAND ACTION FORCE

As for the horizon 2010, it is the near future, and if there is an evolution, there will be most likely no revolution at this term. This evolution will be based on the progressive implementation of the battlefield digitization, the main characteristics - and constraints- of which are only slightly appearing in 2003. There are still lots of unknown factors to discover in this venture and we should be busy with digitization for several decades. Nevertheless it must be noted that the American forces, in Afghanistan as well as in Iraq, used command technologies and procedures that already strongly outline the dominant features of what might be tomorrow battle. Finally, and this is a true challenge for our modern armies, it appears more and

more clearly that forces are facing two operating modes with differentiated imperatives, even if sometimes the shift from one mode to the other - i.e. reversibility - does not allow in practice to have too specific organizations : indeed violence mastering and force coercion, high intensity conflict and long term crisis management do not respond to the same requirements. Thus it would be unrealistic not to take them into account.

Having defined the scope of this article, the attention must focus on the contribution, either positive or negative, represented by the henceforth inevitable use of information systems that will progressively irrigate all the combating levels, with no exception, within the framework of

that air-land bubble (BOA) promised by industry. This input implies two main stakes that will be the core of that capability to impose one's will to the opponent :on the one hand information mastering, and on the other hand conducting the battle in real time or very slightly delayed time, in all its aspects

To be efficient, the future CPs will as a priority master information and time to take advantage of rare and expensive weapon systems, in order to make the best use of their employment and to give them their maximum efficiency.

Therefore coordinating the effects will be more than ever decisive and will inevitably have a joint dimension which should not be forgotten.

Problematics of the tactical command general organization

The tactical command organization is expressed into CP system, which core is the OPS Center and which goal is to transform complexity into orders as simple as possible to carry out.

In the organization inherited from military history, the hierarchy of responsibilities is based on the level of knowledge of battlefield elements resulting from a level of information which, after processing and meaning understanding, ensures the mastering of the operational concept and of the conduct of operations at the considered level. It must be noted that, according to the nest of dolls principle, this grading
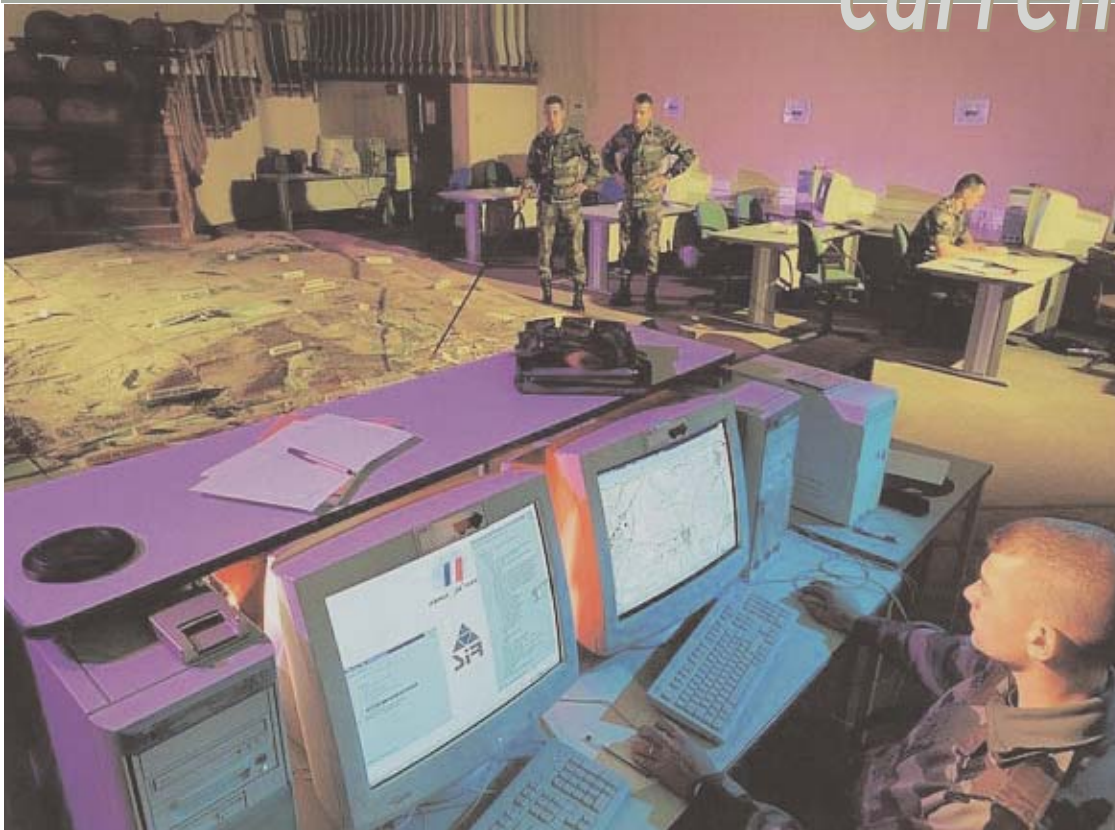
Vincent BEGON/ECPAd

As for exploiting information, it must be possible to express knowledge into decisions

dominant factor. The modern information means will permit a more selective and sharp targeting of the objectives to strike and this in more and more reduced time, that is to say with an accelerated reactivity. In this context, the coordination stakes in fires and effects will contribute to set up very specific CPs for conducting high intensity warfare, even if it is already the case when comparing them to CPs implemented for operations said to be low intensity ones.

Indeed crisis management requires a different command organization. Deterrence, interdiction or control actions are clearly long term operations. Some long quiet periods may be temporarily or more or less locally broken by violence outbreaks. In order to keep its ability to react very quickly to situations close to those which characterize high intensity ones, the OPS Center is yet organized to make a larger place to functions such as CIMIC, operational information, operational infrastructure, etc... Since it has to manage in the long term a very wide range of problems which, even at the lower echelons, come under the politico-military domain as well as under the civilian one, this CP cannot be structured in the same way as the OPS Center intended to conduct only high intensity operations.

More, within the context of coalitions, in high intensity warfare, the multinational aspect cannot be established at a too low level of responsibilities because then operational coherence and efficiency would be at stake. In low

of responsibilities is linked to a system of reference based on the distance from the contact battle area between land adversaries : the brigade CP is " *forward* " focused on the contact battle. On the contrary, the army corps CP, organized in a forward CP and a rear CP is deployed in the depth, in an area where it is supposed to grasp, with the necessary distance and objectivity, the whole of its area of responsibility.

It is not sure that the evolutions of tomorrow capabilities, especially in data transmissions and whereas the battlefield is likely to have more and more gaps, will render this CP organization still operating. As soon as the geographical position criteria towards the contact area will be less vital, it is likely that our interest would be to have the CPs less exposed to enemy strikes, and thus less

vulnerable. This " *relocation* " will perhaps affect the CPs of the subordinate levels. They will have to be as light as possible and we should reconsider the grading of responsibilities, possibly through an approach by operational function.

These main features of the evolution seem in the long term inescapable, even if the horizon cannot be clearly defined. This will of course raise many questions about the role and the place of commanders, about the CP concept itself where the balance between analysis and synthesis capabilities will certainly need to be reconsidered. Because if it is easy to understand that any commander will always need a synthesis function close to him before making a decision, the modern Information Systems may lead to deploy in another location a lot of analysis

functions (and thus of manpower strength) in well protected areas far in the rear or even in " *analysis centers* " outside of the TOA according to the current meaning of that word. Such perspectives are to be linked to a very topical problem, that of the adaptation of CP and therefore of OPS Centers to the engagement mode, whether force coercion or violence mastering, high or low intensity.

In high intensity warfare, maneuver, which is combining movement and fire, remains the key to success. Meanwhile, tomorrow, due to the necessity of saving contact forces having less strength and to the improvements in fire terminal accuracy, priority should be given to fire support (*direct or indirect*) and to their combination within space. Targeting and deep operations highlight this

intensity warfare, the spectrum of what is possible concerning the multinational aspect is far wider and concerns very low command levels. When we know that the multinational aspect is always an increasing factor for the strength of CPs, one sees clearly all that, at least theoretically, can differentiate the structures of a high intensity CP from those of a crisis management CP.

But today we are responding more or less to that problematic with unique tools, the polyvalence of which is achieved by playing on the aggregates allowed by modularity.

Tomorrow the battlefield space digitization will likely lead to a more important differentiation between these types of CPs as the high intensity warfare requirements will diverge from those of crisis management. This will have a cost and it will be more and more difficult for the small or even the medium powers to have the whole range of potentialities. In this context, some nations will possibly be led to some kind of " *specialization* ". One can already see here and there some vocations for crisis management while capabilities for conducting high intensity warfare are evaporating. Another possible option could be to have niches, or to specialize in a given operational function (air-mobility, engineers, etc...) with something like an immediately available tool " *ready to operate* " from conception to conduct and execution, but in a specified function. Another way is of course the regrouping at multinational level of

command capabilities that are more or less incomplete at national level, this grouping being the only possibility to allow the necessary scale effect. But if such groupings are possible on a case by case basis in crisis management - but incidentally not always desirable -, they are not operating for the conduct of high intensity warfare if not set in the long term, with the loss of national autonomy implied by such a durability.

The HRF[1] concept tries partially to solve this problematic at the LCC/Corps[2] level. It favors high intensity, limits the perverse effects of multinational command at corps level and therefore has a vocation to better prepare high intensity confrontations than ad hoc structures. We still have to see what will be the ability of such HRF CPs to adapt to the requirements of low intensity crisis management without accepting some reorganizations being of course more or less temporary but certainly major ones.

To summarize, the tactical command organization is indisputably in development. As it is already difficult to reconcile the capability to conduct high intensity operations with that of crisis management from unique " *organic* " staff entities, the imperatives of tomorrow's warfare are likely to emphasize this distinction with all its consequences and,

possibly, with very difficult decisions to make regarding structures and priorities.

The major evolution criteria of the OPS centers

At the considered horizon, the main improvements will have to affect in priority information and time mastering. These are the domains which certainly most influence the evolutions in the Ops Centers' organization.

As regards information, the challenge is clear : we will need to be able to sort out, to process and then to exploit an increasing mass of data.

The sorting problem is only partially taken into account with the more and more frequent setting up of cells called information management cell (IMC[3]) within the major CPs. An evolution could be the creation of an " *information sorter* " job, more or less replacing the former clerk functions in the different cells of a CP. To distinguish what is important from what is secondary will become more and more difficult because of the data flow and a sorting disposition, an adapted selective sifting through system will have to be set up. While waiting for an efficient automation to be fielded, at the first sorting out level, there is certainly a possible area of expertise to be developed for staff NCOs, trained and qualified for this difficult exercise.

Processing information comes down to give it its meaning, to convert the information data system (*the American Network Centric Warfare*) into a knowledge system (*Knowledge system according to the British Commander Centric Warfare*). We have there a major stake because it demands time and thinking, two requirements the importance of which is paradoxically not favored by the information systems.

So we can note that, in the current CPs, the officers normally assigned to analysis are devoting an increasing part of their available time to discover and collect an ever heavier flow of information.

To save time for thinking, to allow the thorough processing of an information, which relative importance would have been defined by the selective sorting, will need to be more and more considered as a priority.

To illustrate this matter, one can say that after a period of relative and understandable subservience of man to computer, the data processing tool, man will have to clearly retake his power and more distinctly subordinate the data processing tools to his intelligence in to-morrow CPs. **We must nevertheless stress** that future tools will facilitate the thinking phase and enable the combined arms commander to make decisions based on more elaborated proposals, notably thanks to the use of decision and simulation aid tools. Consequently it is no illusion to think that the time presently necessary

> **As regards information, the challenge is clear : we will need to be able to sort out, to process and then to exploit an increasing mass of data.**

for thinking will be de facto reduced and will contribute to the acceleration of the all decision making process.

As for exploiting information, it must be possible to express knowledge into decisions. This refers to meetings dealing with synthesis elaboration, preparation for decision and then decision making within the CPs. In this matter, cultures are sometimes very different, even if thanks to multinational manning, some standardization of the methods is coming in general use. But it is clear that the Americans, the British, the Germans, the French, etc... do not fully work in the same way when they are in a national, or in a multinational context under strong national leadership. So the British " *bird table* " concept (the table where " *one picks at the food* ") expresses a whole philosophy of the decision making process different from that of the French commanders who rely on a vertical disposition of the different

bodies through which thinking is elaborated. To face both challenges of digitization and compressed time, the OPS Centers will be organized for optimizing the decision making process and facilitating the comparison of sectional synthesis. The new computer tools for cooperative work with their emerging capabilities for visualization will indisputably be the vectors of an important evolution for the OPS Centers. This evolution may be not the same for each OPS Center, according to the level of responsibilities : the " *bird table* " at brigade level, the vertical boards at corps level for example.

As for time mastering, it is clear that all factors will concur, at least within a high intensity context, to accelerate the decision cycle and to reduce the time necessary for launching an action. The future weapon systems will be more and more efficient but also, when considering their costs, certainly in more and more limited numbers. Their efficiency

will depend on a maximum reactivity within the cycle which ranges from the collection of an information (sensors) to the employment decision. This will lead to an acceleration of the decision making process, particularly thanks to the support of decision and simulation aid tools, to a more and more sharp and sensitive management of the available time, right at the moment when the information flows may saturate the systems and, in fine, make us to waste time, if we are not organized to remedy for it. Tomorrow's OPS Centers must therefore be organized to win the " *battle of time* " as well as the " *information battle* ". The adjustment of procedures, the intellectual strictness, the strict respect of frameworks permit to give, right now, a first draft answer to that evolution.

Technology will make possible great improvements in these " *battles* ". The TD[4], with the fielding of the RITA 2000 and the hertz support

assets, SICF V3, the HF stations (MELCHIOR), the connecting means for the level 4 Command Posts, the distribution programs for the sheltered CPs, the constellation SYRACUSE III, SICF, SIR, SIT, will progressively create this digitized universe of the battle space where, at CP level, information and time will be the decisive factors for success or failure.

But brains will have to follow... Like the fighter jet or the F1 race car pilots who concentrate in very short time multiple and sharp know-how, the staff officers will have to be more and more force action " *sprinters* ". Their selection and training will have to take this into account. The CPs themselves will have to give an increasing place to anticipation, which, on its own, permit maximum reactivity when time for action is coming, and to the intelligence function for which some federation of the sensors, made possible by the NEB, will permit in real time to enter essential information that, once merged with those of all different origins among which the contact ones, will instantly offer a global and complete knowledge of the situation in the considered area.

On this way towards future, it is obvious that 2010 is only but a milestone in the short or even very short term. The most immediate stakes are the interoperability of the Information Systems and their appropriation by personnel while preserving all their own capabilities for intellectual added value which, put together and coordinated, allow efficient decision making.

Tactical training and simulation

The OPS Center organization

When considering the major criteria that will influence the evolution of the tactical conduct of land operations, it is sure that our OPS Center concept will have to evolve concurrently. The main difficulty, basically, will be as always to reconcile the possibilities offered by new technologies with the preservation of principles which ensure success during the battle or more modestly ensure the mission achievement.

It is not possible to go into organization details in that article but the recent experiences highlight some facts that must be taken into account.

First of all, it is necessary to make a real effort to better standardize the OPS Centers' structures at all levels. The principle of modularity and adaptation on a case by case basis must be better mastered because presently it generates a " *computer disorder* " leading to make a specific case of each network implementation, thus creating poor running and consequently too heavy pre-testing procedures, but also some waste, especially in connections.

Beyond that, the OPS Centers' reliability itself may be at stake, which is unacceptable within the framework of emergency projections.

Secondly, we have to stress the importance of effects 'coordination, at every level. This brings us back to the mastering of combined-arms or even joint operations. For the high intensity modes, there will be, in the battlefield, an increasing integration of capabilities, from the information collection to the delivery of fires. For the operating modes linked to crisis management, the same will apply from information collection to the joint efforts of all the actions belonging to both material or immaterial domains. At all tactical command levels, the capability to integrate, to coordinate, to combine must be developed : this will be possible only by ever more exploiting the possibilities of networks, and of the matrix organization as opposed to the hierarchical one. Nevertheless the matrix organization should not be understood as a lessening of responsibilities or a weakening of the leader's function who, *in fine*, and at his level, makes the decision.

A third criteria is the anticipation capability. In a context where time mastering, immediate reactivity, and straight-away conjunction of a maximum of effects will be keys to success, anticipation is the condition *sine qua non* for all the processes permitting a fast or even immediate implementation of the action means. The first role of the commander is to be never surprised. The stress put on operational planning, the better management of the " *future maneuver* " function are the early signs of the answer given to an imperative which importance will surely increase.

Finally and this is not the least challenge, the increasing digitization of our OPS Centers will have to keep all their importance to men. But we can see that these ones, as soon as they are placed in a computerized universe, tend naturally to stand and thus to act in a virtual world which gradually disconnect them from reality. There is certainly - and this is verified everyday in the CP exercises - a major risk to create an impassable gap between on the one hand conceivers and decision makers, and on the other hand actors in the field facing the enemy. How to ensure the optimum connection between the " *computer bubble* " and the elementary units directly confronted to the action is a question that will arise with more and more acuteness. Tomorrow the organization of the OPS Centers should permit to minimize this risk : above all mastering the information systems must be aiming at limiting the subservience to the machine. It must permit in the OPS Center to find the right balance between the part to be kept for the exploitation of the information systems and the part, essential, to be given to the capabilities for thinking and taking into account all the factors which, for units in the field, are conditionning their engagement. This, in terms of organization and running of the OPS Center, refers to the analysis-synthesis problematic which precedes the decision making and the conduct of operations. As for anticipation and time mastering, the compendium and the activity cycle are the indispensable tools to achieve, thanks to the organization of the OPS Center activities, a right balance between the process for information collection and the one for knowledge acquisition.

> Tomorrow the organization of the OPS Centers should permit to minimize this risk : above all mastering the information systems must be aiming at limiting the subservience to the machine.

1 HRF High readiness force.
2 CCT : theater land component
   (LCC : land component command) ;
   CA : army corps.
3 Information Management Cell.
4 TD : data transmission.

As a conclusion, the foreseeable evolution of the OPS Center by 2010, will once again, highlight the demand for an increasing manpower quality to dominate the also increasing battlefield complexity. More than ever and whatever be the in fine selected organizations, the adapted training and professionalism, which are based on a regular training practice, will be imperative requirements in order to have tactical CPs matching both the challenge and the stakes.

The impact
of battlefield digitization on staff officers' culture

In 1904 lieutenant-colonel Ferdinand Foch illustrates his first publication " *About war principles* " with a second edition of his tactics conferences under the title " *about the conduct of war* ". As the professor of general tactics and military history at the war college, taking as an example the 1870 Saar-Lorraine campaign, he notes the existence of a gap between the culture of German and French staff officers. In the eyes of Foch, the German leadership presents two main qualities : the subordinates' capability of initiative and the top commanders' capabilities of adaptation. On the French side, an excessive discipline, the strict respect of the very letter of the orders, and a passive subordination[1] are prevailing.

BY MAJOR NACHEZ, CDES/CROSAT (2002-2003)

Within one century the French staff officer's culture has very advantageously evolved. Industrial developments have always been a factor of evolution for the force's employment doctrines and, consequently, the new techniques have always had an impact on the staff officers' training and knowledge. With the same kind of impact as the one of the machine-gun arrival on the battle field in 1914, of the tank-aviation combination in 1940 and of helicopter transportation since 1950, the appearance of information and communication new technologies will also modify the force's employment doctrines and the staff officers way of thinking.
The data processing tools will indeed upset three cultural concepts. The electronic mail systems induce a transverse data exchange concept which conflict with the pyramidal command structure, the notion of delegating authority is better established in that case because the commander can not any more know everything and must have more trust in his subordinates, and finally, amongst the more conformist staff officers, the concept of automated assistance to the decision-making process rocks the command concept.

The major revolutions will not appear in the working methods or in the staffs functional organizations but rather in the subordinate's capability of initiative and in the leadership's capability to adapt to the evolutions.

The adaptation of working methods, training and functional organizations

Run by staff officers, boosted by their COS, SICF[2] has become the headquarters weapon system from the brigade to the Land Component level. It makes it possible " *to know* " thanks to the document electronic management function, " *to let know* " thanks to the electronic mail function, and " *to think* " thanks to the tactical sheet editor.
In fact, the SICF arrival in the headquarters modified the working methods, the staff officers training, and the Command Posts (CP) organization.
Without changing them seriously, the working methods must nevertheless be reconsidered to permit an optimal use of the SICF. A data management cell has been established to effectively manage operational information within a command post. The major role of this cell is to manage the open space where everyone can come to extract and publish data in the form of automated office documents (Word, Excel, PowerPoint) and tactical documents (Editac).

We must observe specific rules which will enable us both to always find the right documents at the right places and to facilitate the data saving process during the change of CP. This change, and especially its command aspect, is particularly critical. It is a matter of minimizing the rupture in the chain of command while optimizing

the transfer of the communication means and associated information systems. It is also a matter of ensuring the coherence of the active CP's operational information by transferring to it the data processed by the former active CP. The process related to the change of CP is articulated in three phases : the operational data transfer, a technical SICF switch and the data-processing validation at the new active CP. In this domain, the data management cell's role is certainly paramount to ensure the data confidentiality and integrity. However any staff officer has his part in the success or failure of that change of active CP. If he does not implement the individual safeguard procedures, his works are lost.

Training personnel ranges from individual to collective level. Individual training is provided by the Staff College at Compiegne, it continues through a regular practice of the office automation tools in the units. It is advisable to train all the personnel, including those officers who have both a technical and tactical role within the framework of the decision-making process. There is an often-heard formula according to which within an HQ cell, only the NCOs utilize the system while the officer stands back to preserve his reflexion capability. This too simplistic and conformist idea reflects an inappropriate snobbery. Only the one who has the tactical knowledge to develop a terrain study, to achieve a balance of forces, to conceive friendly and enemy courses of action in order to compare and

confront them, this one is able to bring advisedly an information synthesis. Collective training conditions the proper use of the tool for a maximum efficiency. Marshal de Lattre's motto : " *one tool is only value by the hand that operate it* "[3] this motto also applies to digitization and to those which practice it.

The days of " *practice training* " carried out before a major exercise permit to gradually adjust the CP's organization but they are not sufficient to teach and train collectively a CP. An insufficient collective training can generate an under-employment of the system. In fact during the exercise Aigle 99 the flow of data on the network reached only 4% of its maximum capacity ; the inability or the fear of publishing data information entails a reduced traffic or even no traffic at all on the network. This individual and collective training shortfall was also noticed during the exercises Guibert 2001 and Cobra 2002. During these two exercises the amount of situation overlays exchanged on the network has been negligible in comparison with the resources available.

Consequently a fundamental collective work must be undertaken periodically and not only sporadically when preparing an exercise.
One should not basically modify the functional organization of the headquarters equipped with SICF, nor the current decision-making process,

but rather better organize the cells, or organize them differently, in order to be able to face a massive data flow while preserving the capabilities of data analysis and synthesis which are the only ones to provide exploitable foundations for a fast and right decision taking. Each cell must adopt an open organization facing the synthesis map and not constitute sub-cells withdrawn into themselves. Operators who turn their back to the map, who are isolated in their booth, waste time wrongly when they have to move to look for information. Currently the cells do not have any means to project a synthesized image on a screen, consequently the old fashioned wall maps still exist. Staff officers put data on the wall map and then do the same on the SICF tactical document. This method obliges them to do twice the same input work and thus entails a considerable waste of time, not to talk about the always possible errors when copying.

A projection device would allow to directly fill out the appropriate tactical sheets under the cell leader control's, then to immediately publish them into the open public space. Besides, Editac (a SICF application allowing the creation of situation overlays) must replace PowerPoint for the situation presentations. Too much time is dedicated to the preparation of PowerPoint presentations. The presented situation is thus two hours old, whereas it

could be presented almost in real time.
To ensure a continuity, the working methods and the functional organizations did not change fundamentally. If imposed an important change would have led ineluctably to have the system rejected by the users. However in a close future, when the tacticians operators will be perfectly running their command tools and when digitization will be not any more a new concept, the procedures and organizations themselves will have evolved considerably.

Reinforcing the subordinates' capability of initiative

Since the deployment of SICF in the staffs, the analysis and synthesis capabilities, the creativity, the subordinates capabilities for listening and communicating have improved significantly.

The command and control pyramidal hierarchy will probably blur to the benefit of a more transverse organization. Indeed internal communication within a staff rests partly on the capability that each user has to get the data which are stored in the system data base and to update them according to the access authorization entitled to him. Data can thus be " *drawn* " from a public space or source. For example, the Intel workstation can read and modify the enemy situation data, but can only consult the friendly situation data.

The user can reach " *collective* " situations developed by the various staff cells and internally

exchange messages of all types thanks to the e-mail software. Information is then " *pushed* " from one source towards an addressee. Consequently, between drawn and pushed data, the cell leader is not any more the single source of information. His subordinates have a greater freedom of action and extended responsibilities, among others the one to go and seek data where it is and to disseminate it where it must go.

Digitization reinforces also the staff officer's capabilities for analysis and synthesis. The data management consists in presenting information in a user friendly and readable way in order to allow a fast, complete and coherent evaluation of the tactical situations, in sharing the conclusions as they appear and in facilitating the drafting of the graphics messages which materialize the decisions taken.
The automated assistance to document formatting enables the staff officer to concentrate to the maximum on what is important. So during exercise GUIBERT 2002, a German student, belonging to the 115° promotion of the Higher Staff Course (CSEM) produced in a few hours, nine enemy's courses of action.

The office automated tool enabled him to conceive courses of actions quickly, then to present them to his leaders in order to help them in their decision-making.
For young officers who are born in a data-processing world, who know the Internet... one have to admit that it is easier.
For Foch, the efficient

Gilles ZINDY/CDES

The working methods must nevertheless be reconsidered to permit an optimal use of the SICF.

reasoning process is that one which calls upon imagination, creativity, cleverness but also upon the staff officer's common sense. He rejects what he describes as " *the constant call to the reason* ". The most rational assumption supposedly represents the enemy's intention, the maneuver will consist in opposing it. On the contrary it calls upon reality, which requires from the staffs to make a real Intelligence effort about the enemy's layout, about its theater deployment in order to eventually get closer to the " *knowledge of truth* "[6]. It is thus necessary to confirm the assumption through knowledge. The battlefield digitization aims precisely at providing any person in charge of an operation with informational superiority, i.e. the capability to acquire, process and exploit the data useful to the mission. He must thus have at his disposal, in a transparent way, any useful information about the friends as well as about any enemy within their environment, at the right time, whatever might be its location, whatever might be the source, and in full

safety, so that he can be the first to make the decisions which will give him the advantage.

The positive impacts are known, the commercial step of our defense industries praises the digitization merits and benefits, which is legitimate, but it is the responsibility of the high command to evaluate in the field, during the deployments, the digitization effects thanks to an after action analysis and experience feedback and then to develop a doctrine, cementing the victory, in order to channel the subordinates' freedom of action.

The permanent adaptation of leadership to the evolutions

In May 2002, Major Jean-Baptiste Duvivier's article[5], is thundering digitization : " *are the automated command assistance tools going to kill leadership ?* "[6]. Without taking a too much dramatic approach, one should pay attention to the effects very rightly revealed by Jean Baptiste Duvivier and consequently correct

them. The mood was very much in favor of digitization, it is advisable to rebalance this dynamic movement by keeping an open mind and a sense of adaptation.

One of the consequences of the information systems is " *overinformation* " which can lead to freeze the decision. As a matter of fact, the only way of identifying relevant an information and presenting it to the decision makers, i.e. data processing, must be the keystone of the staff architecture. At the end, the amount of data used by the commander to make a decision is very small. Lots of collected information data are of no interest for decision-making. Therefore the information transmitted to the commander must be only high level synthesis.

The major units commanders do not make decisions based on reports about isolated tanks units, but rather on the perception of the movement of an enemy armored unit and on the understanding of a maneuver. To preserve their synthesis capabilities, the decision makers ask their

subordinates to show indicators. This term is not neutral, it demonstrates the leadership's evolution towards management techniques that are used in the corporate companies. Collaborative work system can, in the field of overinformation, prove to be dangerous. As a matter of fact, each HQ cell produces its paragraph of the operation order. The length of this paragraph is not normalized and this is a fault into which the Latin culture falls easily. When they are shaped through concatenation, the paragraphs become an operation order impossible to exploit in less than two to three hours. One can also understand why such a length can spoil the proof-reading and overall coherence work. Senior leadership has no time to read through again the operation order and just signs it for distribution.

Thus even if in the enemy "*situation*" paragraph, the enemy course of action number one envisages the parachuting of an air assault battalion on an airport, one can find into the logistic paragraph a planned deployment of the support divisional base on the same airport. On this topic, we must take example on the pragmatism of our British allies whose brigade operation orders take one A4[7] sheet of paper,

list of appendices and distribution list included ! Some paragraphs of our operation orders include only internal business which diverts the attention and blurs the understanding of the commander's "*intention*". We must be suspicious about excessive automation. Idleness being one of the man's weak points, it would be very bad if this man was leaving to the machine those tasks for which he is the only one responsible and able to accomplish them... According to General Fritz VON KORFF, commander of the German Army officers training school : "*the digitization of engagement will not deprive the military commander from his responsibility and freedom of action*[8]".

The major challenge for the senior leadership is to adapt rapidly to the technologies evolutions. During symmetrical conflicts, planning was oriented towards the threat. Today the asymmetrical conflicts lead us to plan on capabilities. For General Jef VAN DEN PUT, Commander of the Belgium Defense Senior Royal Institute, new technologies invite us to reconsider the current military planning methods. Until now, it was a matter of taking as a starting point for the design of new military systems, the nature of the foreseeable threats, and a

matter of deducing from them the armed forces missions. This prospective exercise has become precarious, at least for precision. A new method consists in planning no longer on threats but on capabilities. The starting point would be to identify the decisive weapon of the future; the "*master weapon*" as it is named by the Anglo-Saxons. Today, this dominant weapon, which is able to disturb the enemy's tactics, and around which one will organize the co-operation of all the others weapons, is called according to the English terminology the C4IR (*Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance*).

Part of the challenge consists thus in supporting the installation of an ensemble that will permit to better exploit information data, a coherent system, which is the condition of the others weapons' effectiveness, as well as the one of the global action[9].

1 In Maréchal FOCH, De la conduite de la guerre, 9ᵉ édition, Présentation de Jean-François COLLOT d'ESCURY, page XIV et XV.
2 SICF : The forces Command and Information System.
3 Marshal de Lattre de Tassigny in Indochina, 1952.
4 Maréchal FOCH, De la conduite de la bataille, 9ᵉ édition, page 316.
5 Joint war college student.
6 Revue Le Casoar, avril 2002.
7 21 x 29.7 cm.
8 Centre de la Doctrine et de l'Enseignement Supérieur, L'officier dans le monde au XXIᵉ siècle, les actes du forum, 15 février 2002.
9 Dito.

New technologies belong to a process of permanent evolution. To remain behind in the understanding of these possibilities is giving an advantage to those which will try to use these technologies against us. It is thus a new form of command which hustles the staff officer's culture.
The reinforcement of the subordinates' capacity of initiative as well as the permanent adaptation of leadership to the evolutions constitute the major impacts of the new communication and information technologies on leadership. In fact the battlefield digitization starts first of all with a digitization of the minds. For that reason, within the Army Staff, the battlefield digitization standing group prepares the forces to this technological shift and the Army Doctrine and Higher Military Education Command conducts a major study on the future land action. The goal is indeed to provide the Army with a unity of views the only one able to guarantee the convergence of the efforts during execution.

"I saw too many splendid soldiers being killed or, what is even worse, being massacred while obeying only simple sketches without putting their brain at work : one should first fight with one's brain and that is good for the private as well as for the commanding general "

General Jean CALLIES - godfather of the promotion of the Military Academy of Saint-Cyr 1986-1989

The intelligence function in the "future land action"

The new context of the employment of Forces and its evolution perspectives confer a very specific importance to the intelligence function[1].
In fact, the foreseeable discontinuity of the friendly and enemy layouts, the possibility to engage actions in the depth, the separation between sensors and "*effectors*" rendered possible thanks to the increase in the range and accuracy of strikes, the deception maneuvers and the information war, will ineluctably lead to an important increase in intelligence needs.

BY COLONEL MARTIAL DE BRAQUILANGES, HEAD OF THE CREDAT/B2 (2001-2003)

Of course, it will always be the case of detecting alert clues, of clearing an uncertainty, of seeing right through the intentions of the opponent, of determining the gravity centers, of facilitating the friendly maneuver and of contributing to the force protection.

What will change, and has already changed, is the increasing complexity linked to the development of the dissymmetrical[2] or even asymmetrical[3] threat, exercised by some new players with neither doctrine, nor area of engagement, often acting in built up areas and bearing no real distinctive signs.

Therefore, it is obvious that the " *warfare fog* " is likely to become thicker.

To meet this challenge, the French Army has decided to make a specific effort in the Intelligence function, especially in the following fields :

- In order to better see, understand and anticipate, one must have more numerous and complementary intelligence sensors[4].
- On the other hand, it seems essential to ensure a better coordination in the employment of these sensors.
- It is the case of better integrating all the sensors participating in the acquisition and identification of targets.
- It is also the case of facilitating the information processing[5], in order to notably meet the risk of saturation or disinformation.
- Equally, it is the case of better integrating the place of intelligence within the decision making process of a staff.
- Last, **the circulation of information, the access to and the distribution of information must be improved**, and have a common and updated reference situation whatever the levels of responsibility.

To achieve this, the Army has envisaged three types of answers :

- The first answer is of a **conceptual** nature.
The recent adoption of the **ISTAR**[6] NATO concept aims at temporarily or permanently regrouping all the range of sensors deployed on the ground in order to feed all the players of the battlefield with intelligence. These sensors may be deployed by the battlefield surveillance, target acquisition, reconnaissance and intelligence functions.
The notion of **dedicated** intelligence (artillery radars - artillery fires) must now be replaced by the notion of **shared** intelligence, which warrants a wider consistency and a better synergy in the employment of sensors.

- The second answer is of a **structural** nature.
Following the example of what is done at the level of the land component with the units of the intelligence brigade, a need to have a multi-sensor intelligence battalion available at level2[7] has emerged, thanks notably to the RETEX[8] process.
This latter unit is aimed at becoming the intelligence and counter-intelligence tool of the " *division* ". It is along these bases that the evaluation of this battalion will start in 2003.

- The third answer pertains to the **architecture of the SORA[9] information system**, which is the federative project of the French Army intelligence.

The SORA project aims at :
- Helping the employment planning of sensors,
- Optimizing the search and gathering conduct of information,
- Exploiting information and intelligence **in due time**,
- Ensuring the distribution and storage of information and intelligence,
- Contributing to the elaboration of the " *Land Tactical Picture* ".

Thanks to this process, it is really the case of optimizing the intelligence cycle, by enhancing the acquisition and gathering of information, by facilitating the intelligence exploitation processing and making sure that it is as widely distributed as possible, either " *on request* " mode or on " *distribution* " mode. No one will no longer be the real owner of intelligence, which will from now on belong to those who really have a need for it.

Now remains to concretely define under which conditions and along which lines will be achieved the required synergy expected between acquisition and intelligence sensors within the ISTAR concept ; the organization measures, the sharing of tasks, the co-ordination and procedures that are to be implemented are not negligible. Pragmatic solutions will have to be rapidly found without waiting for the arrival of the SORA programme.

1 *Intelligence : results of raw data processing concerning foreign countries, enemy armed forces or likely to become enemy, the areas in which operations are effectively carried out or are likely to be carried out. The term is also valid for activities pertaining to the building up of intelligence and for organizations dealing with it (TTA 106).*
2 *Dissymmetry : significant imbalance pertaining to the levels at stake or to the performance of assets but less on the nature of assets or the way to act.*
3 *Asymmetry : complete or significant disparity concerning war objectives, nature of assets employed and courses of action. Ways of thinking and action of one party remain incapable of bringing an appropriate answer to problems posed by the antagonist system.*
4 *Sensor : device aimed at detecting objects or activities and enabling to figure or record them thanks to the energy or particles they transmit, reflect or modify.*
5 *Information : raw data, of a more general nature and of a lesser specific military nature.*
6 *ISTAR : Intelligence, surveillance, target acquisition and reconnaissance.*
7 *Level 2 : division level.*
8 *RETEX : RETour d'EXpérience. (Lessons learnt)*
9 *SORA : Système d'observation et de renseignement aéroterrestre (Airland Intelligence and Observation System).*

The intelligence function/Future architecture

Intelligence
Information
Data
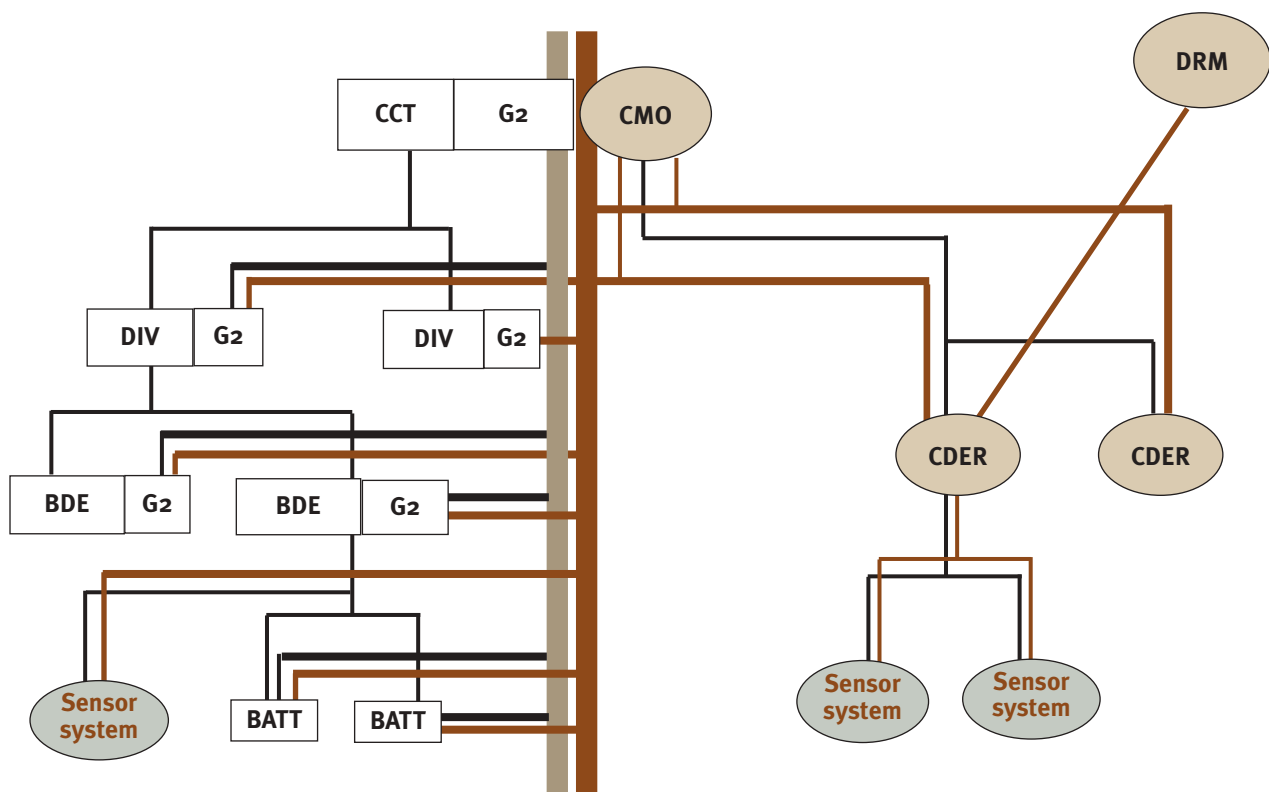
A network organization for the benefit of everyone

DRM : French Military Intelligence Agency
CMO : Implementation Center
CDER : Intelligence Exploitation and Direction Center

Logistics
within the framework of Future Land Operations

BY LIEUTENANT-COLONEL FRANC, STUDIES CELL – LAND FORCES LOGISTIC COMMAND

ASSUMPTIONS

Invariants by the term (2010-2015)

Decision will be achieved only by committing land forces, the only ones able to control, occupy or hold an area. Whatever the expected evolutions, several factors will endure. War principles remain perpetuated in the continuity as well as commitment on the ground - even if this more and more conducted in non linear areas that are to be exploited by favoring surprise effect but also that require to be protected from them in order to guarantee the security of units. Similarly, CSS for units in contact remains essential, as well as deploying logistic units into the rear area of the theatre. Maneuver capability within the Civil Defense framework will also be maintained.

Uncertainties

They mainly deal with political and institutional fields.
Within the considered term, the geopolitical framework remains uncertain, because it is risky to assert to which extent European Countries will be integrated, to precise the relative weight of the United States towards Europe, and to define the development of the current centers of crises, etc. As regards defense, it will be the same towards the institutional framework pertaining to the organization of armed forces, i.e. the degree of joint integration, the Army's design, the fields of expertise of the different Services, etc ...

New factors

Changes in the forces' commitment framework are a primary element to take into account to reconsider logistic support. The asymmetry principle and violence mastering have become realities which condition lots of parameters and notably require, among others, the development of other COAs. The increasing number of commitments in built-up areas set definitely the problem of supporting as well committed units as the local population living there. Considering the force's environment in its broad meaning, i.e. from legal, economic, social, political and media points of view, etc. is an inescapable factor that tailors the size and capabilities of this force.

Implications in terms of logistic support

Permanency of the existent fields (supply, maintenance, medical support), with a multiplier factor for everything related to man life support.
Medical support experiences a steady increase in the "*psychological support*" function by taking into account treatment of combat reactions and prevention prior to combat stress. If the notions of forward medicalization and "*surgerization*" are increasing and coming into general use, they are strictly tailored to the needs. Maintenance benefits from the integrated automation of logistics within the weapons systems, which permits to detect preventively any breakdown (of "*logistic failure*" type).

As a result, we can notice on the one hand a limitation of the repair function to combat damages only, and on the other hand the implementation of a preventive maintenance system.
As regards delivery, the convoy system is wide spreading owing to insecurity linked to theater non linear areas.

Thanks to the implementation of the Land Multi-Purpose Carrier (PPT) before 2006, the addressee's selectivity (for the allocated resource) down to the lowest levels will permit to monitor supply flows carried out by impulses, i.e. according to forward requirements and through the implementation of rear supply points and of a customized follow-up made possible by using the bar-codes' technique.

The will to grant combat echelons with a larger initial self-sufficiency - locally and temporarily - could appear to be conflicting with the principle of lightening forward troops. However in the facts, this contradiction does not exist, as we apply the principle of strict self-sufficiency according to the duration and type of mission to be carried out. This notion goes in parallel with the concept of

stockpiling in the theatre, a guarantee for an increased reactivity.

Man life support has to include two different kinds of needs : on the one hand, the extreme modularity of capabilities offered within this area (through an increasing number of lower echelons to be supported), on the other hand, the responsibility of supporting NGOs, even directly the population, which imply mass operations (owing to the important strength to support in this field).

The actions pertaining to stationing support will favor units' accommodation in semi-solid facilities or in existing - possibly rehabilitated - ones, and will be part of the early deployment of the force into the theatre. Taking welfare standards into account will

be the rule.
Deployments will tend to be simpler than current ones[1], from POEs (*Points of Entry*) into the theatre up to the benefiting units.

Future logistics

If war principles that we apply to-day will be still relevant by the considered horizon - as they are universal - it becomes obvious to assure that future warfare will be of a different nature, that the role entrusted to armed forces by the government will be different - at least in Western industrial countries - and that the organization, even the nature of these armed forces, will also be subject to lot of changes.

After having endeavored to define future warfare in its broad lines, this article aims

at drafting the consequences to be expected for the logistic function before conducting a capability analysis for each field.

Today, we have to recognize that the population will be a major stake, whatever the type of forces' commitment - symmetrical, dissymmetrical or more often now asymmetrical. Consequently, controlling the human and physical environments will remain an invariant of the maneuver, hence the importance of the land component for defining and setting up armed forces.

Multinationality, a permanent feature

So, multinational engagements will certainly become a permanent

feature, whereas commitments within a national framework will refer to specific engagements, different from operations related to civil defense missions, which will keep increasing. Multinationality will be accompanied by task sharing among the various contributing nations, which could possibly extend to the specialization of one nation on a specific operational function. Nevertheless, everything lead us to think that national interests - still enduring - will be a powerful limiting factor for that task sharing.

Finally, the organization of armed forces seems more and more directed towards an increased joint integration. This " *joint* " factor will primarily apply to the C2 and intelligence

A completely urbanized theater

functions, but it will also affect the standardization of common equipment. In this respect, we can think that by the considered term, logistics will be a joint function.

Besides, concerning the sole land component, the "*close battle*" function will continue to exist, even if its relative importance within land forces will tend to change. As for the Combat Support function - especially in the field of ground fires, as well as into the depth as towards the third dimension - their implementation will be subjected to centralized planning, at joint level.

Implications on the logistic function

This new operational deal will have direct implications on the logistic function both at conceptual level and at the one dealing with organization and implementation.

Whatever the form of conflicts to solve by military assets within the considered period, there is no doubt that the commitment of a land force will always require Combat Service Support.

The first logistic consequence which results from it is built on a paradox : indeed, whereas the forces to support are expected to downsize, the requirements in logistical support are likely to largely increase owing to the new factors to be taken into account : as the population has become a stake in future conflicts, responding to all or part of the essential needs necessary to its survival will be a major concern for the force

logisticians. In other words, though the force's logistic assets are primarily intended to meet the units' requirements - necessity knows no law - the committed force will also have to be able to meet the population's expectations, especially in the field of medical support and man support, even of stationing support. It will be impossible to conceive the support of an operation without including a specific support to populations. Possibly less present during the phase of force coercion and during the phase of entry first, this aspect will have all its importance in violence mastering : the adhesion of the population to the force's action in a theater will go through the support, total or partial, provided to that population.

This aspect will play a major role for the international recognition of the legitimacy of a military action in the field. In the same spirit and for the same reasons, CIMIC will be systematically integrated as parties in the logistical support of any military operation, once the control of the situation has been achieved.

But is it really necessary to keep assets dedicated to this sole purpose ?
This factor of support to population, even the population itself as as take, includes another constraint in terms of environment within the framework of the operation : that of urbanized terrain. Indeed, the urbanization movement, which prevailed during the XXth century, is likely to accelerate and increase.

Precisely, as an aggravating factor, these unstable areas are the place where all the crisis' factors are developing and concentrating, and are also the ones with the most anarchistic and fastest urbanization phenomenons[2].

A completely urbanized theater

It will no longer be the case to consider "*fighting in built-up areas*" as a possibility, but to consider a completely urbanized theater[3]. If at logistic level, it can be a relative advantage (in terms of "*solid*" facilities and stabilized deployment areas), the constraints of compartmentalization, of axes' vulnerability, of alternation, even of intermingling, of - secured or not - held areas lead to very decentralized warfare. The logistical support of a force committed in such operations will have to be based on a network of depots - as close as possible to the committed units - based on a complex and very vulnerable maneuver network ; consequently, securing the area of operations will be a major and permanent requirement for combined-arms forces.

In addition, taking into account the aspect of commitments, which will alternate long phases of low intensity with short phases of very high intensity combat, logistical support will have to be efficient in both cases, without any solution of continuity. This will require an organization able to have its reversibility being reactive at the same tempo than the changes in

intensity and phase of the combats. Permanently, the logistic system will have to be characterized by this duality. In particular, its capabilities will have to be tailored in order to meet the highest common denominator between the requirements due to commitments' intensity peaks and those generated by duration and legal framework.

This is the reason why the striking and suddenness character of combat actions will not allow to subject maneuver units to a processional logistic system -with sometimes totally unacceptable allotted time for delivering resources. Units should have a strict self-sufficiency tailored to the mission in order to be free from the constraints related to delivery times without losing their flexibility because of too " *rich* " CSS echelons.

This balance will always constitute the Gordian knot for the planning and control of an operation's logistic support.
The adoption of the principle of setting up temporary supply points could solve this dilemma partially.

An increased vulnerability

Moreover, the vulnerability of deployments and logistic flows will be increased. In a context of very mobile combat, dominated by the fluidity of successive deployments and very brutal combat operations, the logistic system will always depend on fixed deployments and on axes that do not always cross areas secured by friendly troops. Even if logistic bases have an increased degree of mobility, sea or air POEs (*Points of Entry*) into the theater will always be fixed ones and linked to the existing infrastructure. For this reason, they will be extremely vulnerable to enemy threats in the depth.

Considering surface flows, they will also be linked to the existing road or rail infrastructure and the crossing of unsecured areas will be a real factor of vulnerability. Within this framework of great vulnerability and in a context of force generation with their strict self-sufficiency, everything lead us to believe that the security of deployments and logistics assets will constitute a major concern to be taken into account as early as the operations' planning phase.

Timely information management

Last, as regards improvements to be expected from digitalization applied to logistics. They it will permit to timely manage all the information, and thus to largely free ourselves from the planning time constraints for the whole system. An important improvement is to be expected as regards the identification of resources and their allocation. It will be possible to directly supply the benefiting unit in contact from a unique multifunction base, while being free from intermediate deployments[4].

Furthermore, a single C2 information system integrating all maneuver functions including the logistic systems will likely concur to the old principle of maneuver unicity by integrating the logistic function from the conception to the execution of the OPLAN.

1 Which have remained nearly unchanged -in their principles - since those implemented by the French 1st Army's G4 during the 1944 liberation campaign (the equivalent of a theatre logistical area (ZLT) around Marseille and Toulon harbors, through which most of resources were transited from North Africa and Italy - the equivalent of an Army LG (Logistics Group) - logistic base 901 centered on the Dijon area and Division Support Areas to the benefit of each of them and which deployment varied according the manoeuvre momentum...)

2 For example, currently Cairo's conurbation starts to reach the Pyramids' area, which was at one hour' ride of the city during the not so remote time of British presence.

3 For this reason, the Israeli experience is significant : in 1967, TSA-HAL had occupied a Gaza Strip, practically empty of any dwelling, except for the very town of Gaza, whereas thirty five years later, the whole of the territory is entirely built.

4 Whereas the knowledge of forward units' requirements could take time because of the difficulties for transmitting information, intermediate deployments enabled afterwards to limit routing times for a resource.

In short, we will have to adapt to multiform types of commitments occurring at irregular and random intervals (succession of combat phases followed by periods of stabilization that can include intense activities likely to continue to the benefit of populations) and for this reason to acquire a maximum of flexibility and reactivity, which could have an influence on the future structures of units and logistic bases while complying with the principle of forward troops' lightening - a guarantee of mobility.

The support of the sole committed French forces will remain the priority. However, the high-and-low-intensity duality principle of equipment should permit to respond to the various types of missions to be carried out in particular within a CIMIC framework. But the question is still pending to know whether, as early as the planning phase, assets should be dedicated to carry out missions out of the framework of any direct support of forces, all the more when the consequences in budgetary terms and availability of means will be very important.

The contact function and the
future land action

Among the transformations in the conditions of forces employment that took place over the last years, three main ideas deserve much attention : the engagements decided by the political masters, most often within an alliance framework or according to an international mandate, do not put at risk the nation's vital interests any more ; the already underlying sensibility of the western public opinions for human losses has turned more critical and finally, the strength and the cost of professional armed forces are hardly fitted to long term commitments or for accepting excessive losses.

This being acknowledged, nonetheless the fact remains that in military operations units should be committed in a lasting way in the heart of the action, in order to provide information, to control, to deter or to destroy. These tasks essentially pertain to the contact function which importance within the forces is continually decreasing in quantitative terms. Therefore, in order not to prematurely wear down scarce and precious units, and to reach at a minimum cost and as quickly as possible the assigned objectives, the military commander has to explore all new tracks opened by the technological advances. The studies related to the " *Future Land Action* " are fully in line with this reasoning process.

BY COLONEL DANIEL **POSTEC**, CREDAT (FRENCH ARMY REALISATION AND DOCTRINE STUDIES CENTER)

The technical capabilities of the current and future weapon systems : LECLERC, TIGER, and FELIN, to mention the main ones only and the sudden emergence of digitization in our command and control systems inevitably impact on the concept as well as on the conduct of operations. To the military commander it appears possible to limit direct contact and consequently the possibility of excessive losses while imposing his will on the enemy. Shared information about the locations and capabilities of friendly and enemy units, an increased coordination of the various operational functions, the in time information forwarding, all are governing factors to speed up the decision making process and to boost again the maneuver tempo. The courses of action considered in the FLA[1] then tend to preserve as much as possible the contact combat units, always limited in numbers, to commit them only at the right time and location against a pre-identified enemy already shaped by the effects of the other ones combat functions.

As a broad outline, the maneuver of the contact combat units will be based on three major phases :

• a preliminary dilution of the field dispositions as well as keeping at a distance the bulk of contact units are ways to reduce their vulnerability and deny the enemy to acquire some reliable information about the friendly dispositions and intents.

• the quick concentration of contact units made possible thanks to the knowledge of the battlefield and to an immediate forwarding of orders takes the enemy by surprise and put over him a locally unfavorable balance of forces.

• a violent exploitation of the tactical opportunity so created, followed by the dispersal of units, saves them from an enemy reaction and allows committing them again later on.

However these tactical practices require not only a perfect technical mastering of the operated systems but above all to develop at every level, whether conception or execution, initiative, care for information, and battlefield understanding. Those qualities are nothing new but techniques can make them much more effective

In conclusion, it appears essential that the contact operational function be resolutely engaged in this new approach. However, to go a step further, we should not be victims of the technological mirage. The enemy, having analyzed its own vulnerability fields, will always try to minimize them by attracting our forces in an unfavorable environment, or by using courses of action favoring stalemate and attrition operations. Combat in urban areas and asymmetrical actions have a great future.

1 Future Land Action

The Ground-to-Ground fire function

By 2010-2015, the firing systems will favor capabilities that will enable forces to have brutal, massive or accurate fires. In order to take part in winning the decision, the effects of these weapons will be applied to the contact battle carried out by maneuver forces as well as to targets located outside of the contact area. Obtaining these capabilities goes through technological improvements, which relate to ammunition's accuracy (destruction by direct hit), to the optimization and diversification of ammunition's effects, to reactions in "*reflex*" time and to the increase in firing range.

BY COLONEL DE TARLE, CREDAT (FRENCH ARMY REALISATION AND DOCTRINE STUDIES CENTER)

• **Accuracy through direct hit :**

Accuracy through direct hit beyond a 30-kilometer range will be reached thanks to the future LRM guided rocket (G-MLRS), which will reach a 70-km range with a 10-meter accuracy. The 155-mm Sense and Destroy AT shell (ACED) will make possible to attack and neutralize, through their roofs, either stopped or moving MBTs, light armored tanks or artillery SP (Self-Propelled) howitzers. Finally, the possible achievement of the TRIFORM (Tri-National Fiber Optical Missile) will offer a selective destruction and controlled striking capability for a specific target (CP, piece of equipment, signals center...), while allowing to minimize collateral damage.

• **Optimization and diversification of ammunition's effects :**

The optimization and diversification of ammunition's effects achieved thanks to the fielding of the G-MLRS rocket (440 dual-effect grenades[1]), of the OGRE-type "*cargo*" shells (63 dual-effect grenades) and of the procurement of the BONUS shell will grant an important selective destruction capability with reduced collateral effects and logistic weight.

• **Reaction in "*reflex*" time :**

The C3I[2] ATLAS system (Automated Field Artillery Fire System[3]), which is an automated management system of field artillery fires, will enable the communications and data processing of artillery battalions with target acquisition, C2 (*Command and Control*), logistic support and firing assets. It will constitute the "spinal column" for ground-to-ground artillery and, on this account, it will be the primary link of the "*reflex time*" chain.

Moreover, the improvement of the firing chain's reactivity will be made easier by operating the COBRA counter-battery radar, which will characterize enemy artillery activity in reflex time. It will be the preferred target acquisition mean for MLRS battalions.

• **Increase in range for striking the depth :**

The increase in range will permit to destroy or at least neutralize the whole of the objectives located in the realistic depth dealt by a land force, about 60/70 km.

Trying to increase the range results into selecting the 52-caliber in order to be able to support distant units and to double the surface of the treated zone, by procuring a G-MLRS rocket with a 60-km range, and by the will to be equipped with the TRIFORM (*Fiber Optical Missile*) to deliver selective and accurate strikes on specific high value targets, in the whole of the tactical depth (up to 60 km).

The contribution of these new technologies, in particular with the implementation of the ATLAS system, continues the digitalization process for ground-to-ground artillery started with the ATILA system. In the force coercion operating mode, it will be expressed through a reinforcement of the field artillery's role thanks to an increased and all-weather flexibility, a dynamization of assets' control, and a better availability of fires. In violence mastering, it will contribute to the success of land operations with an even more adapted intervention capability, from intimidation to retaliation.

1 Dual : AP-AV (Anti-personnel - Anti-vehicle).
2 C3I : Command, Control, Communication and Intelligence.
3 ATLAS : Automated Field Artillery Fire System.

The Ground-to-Air defense function

The general purpose of ground-to-air artillery is to ensure the freedom of action and the direct protection of a force or of a sensitive location against the air enemy, and to concur in the attrition of the opponents' air assets. But the threat is changing. Tomorrow, we will not only see the appearance of the stealth aircraft or of the helicopter in tactical flight but essentially a multiplication of unmanned vectors (drone, cruise missile, ballistic missile) as well as a wide range of armaments fired at security range and then guided towards their targets by all sorts of autonomous or semi-active systems. In order to fulfill this role, the ground-to-air artillery is implementing complementary weapons systems both in their employment and in their effects for which it conducts a large-scale modernization.

BY COLONEL DE **TARLE**, CREDAT (**FRENCH ARMY REALISATION AND DOCTRINE STUDIES CENTER**)

• The medium range ground-to-air :

The medium range, presently equipped with the PIP3 version of the HAWK system[1] is awaiting the fielding of the SAMP/T system (Army Medium Range Ground-to-Air) as soon as 2006. This weapon system will bring real new capabilities, and it will be a real technological breakthrough compared to the previous generations : enhanced detection including in a very heavy electronic warfare environment, multi-target firing control post and anti cruise missile capabilities. Above all it will be the first system able to fight against ballistic missiles.

• The short range and very short range ground-to-air :

The short range with the ROLAND[2] system will undergo an upgrade that will enhance its discretion as well as its efficiency both in range and altitude against fleeting, maneuvering or hardened[3] targets. The very short range which has gradually fitted the initial version of the Mistral[4] with an IFF[5], a thermal camera as well as a radar to allocate targets at platoon level. Furthermore, this system will see, during its mid-life update, the hardening of its missile against electronic counter-measures and become able to engage drones and cruise missiles.

• An integration of all Army participants within the 3rd dimension[6] :

The main evolution essentially concerns the integration of all these weapons systems (ROLAND, MISTRAL, MRAD) within the MARTHA[7] network that will optimize not only their freedom of action but will permit to enhance the flight security of all friendly aircraft. In fact, a network of sensors and of transmission assets will enable us to know in real time the locations and the activities of all Army systems in the 3rd dimension. Its fielding is presently underway in all battalions. Linked to the Air Force and to the allies, this network will allow to individualize the reactions of each ground-to-air launcher in relation with the threat and its context, thus multiplying its efficiency.

More effective thanks to a wide scale modernization of its assets, the ground-to-air artillery will become an operational function nearly fully digitized that will make it able to carry out permanent, immediate and proximity operations in the fight against the air enemy complementarily to the Air Force role.

1 Range of the HAWK : 40 km with a ceiling of 18000 m.
2 Range of the ROLAND : 6 km with a ceiling of 3000 m - Range of the Mistral : 5 km with a ceiling of 3000 m.
3 Helicopters, Unmanned Surveillance Aerial Vehicles that should become UCAVs : Unmanned Combat Aerial Vehicle).
4 MISTRAL : MISsile TRansportable Antiaérien Leger. (Light Anti-aircraft Transportable Missile)
5 IFF : Identification Friend or Foe.
6 I3D : Ground-to-air Artillery, Army Aviation, drones and Horizon radar, fires in the depth.
7 MARTHA : MAillage des RadarsTactiques pour la lutte contre les Hélicoptères et Aéronefs à voilure fixe. (Tactical Radar Network to Engage Helicopters and Fixed Wing Aircraft).

The Ground Space Management function

The "*ground space management*" function is certainly very concerned by the "*future land action*" study (ATF). As a matter of fact, the expected evolution of the equipment within the AGESTER[1] function, but also the one of its environment, should lead, by the considered horizon, to a better anticipation and coherence of the maneuver.

BY MAJOR FRANÇOIS GOMBEAUD, CREDAT (FRENCH ARMY REALISATION AND DOCTRINE STUDIES CENTER)

The CIS progressive adoption

On the one hand, the progressive adoption of increasingly powerful communication and information systems will, as for the other operational functions, facilitate, precise and accelerate the transfer, update and exploitation of data. This should induce the optimization of the management of obstacles, trajectories (movements), stationing and communication high points. The transmission of NRBC messages and alarms will be automated : the events management will thus be simplified and speed up, which will provide the force with an increased protection. By so doing, maneuver planning and conduct will permanently integrate the assets of engineers and specialized NRBC defense.

Evolution of the maneuver

Besides, the maneuver itself is to evolve. The ATF study is (today)primarily interested in the coercion of forces' mode confronted to a symmetrical enemy : innovative concepts that are considered, such as engagements in interval areas, development of deception actions, could notably lead the engineers to revise their doctrine. Implementing a ternary structure in the engineers combat units, to be completed by 2004, will permit to obtain effects reinforced by the potential disembarking of a greater number of soldiers ; moreover, a reorganization of the units could be envisaged, at least on an ad-hoc basis, in order to make them available for combined arms operations down to the lowest tactical level and without any delay, in particular in urban areas.

Thus, within the infantry-engineers couple, the sapper will be able to bring solutions as far as mobility is concerned: horizontal or vertical opening of ways, mine and booby traps clearance. As far as counter mobility is concerned, the sapper will support the infantryman's action by means of obstructions or through the neutralization of weapons thanks to the use of multi-purpose weapons.
Thus the AGESTER assets will meet perfectly the expectations of the "contact" function in each of the three phases of the maneuver (preliminary dilution of the dispositions, rapid concentration of the units, fast exploitation of tactical opportunity).

More powerful assets

Last the AGESTER function is expecting in the next years the fielding of modern and more powerful equipment. For example, the new HPD 4 anti-tank mine, remotely controllable and reversible, allows a brand new conception of counter mobility, more precise, more reactive and reversible : a sector or a direction will not be irremediably blocked by the sapper any more. Since it will be possible to withdraw the sappers' actions, they will probably be utilized more often. The assets intended to replace those which currently equip the engineers units will be faster, modular, and possibly remotely operable (robots). Thus, the engineers future combat vehicle (ECFG) as well as the other systems (SyGOGNE for the ground space global management ; SyDERA and SyDELO for close or distant mine detection) will significantly improve the engineers capabilities, especially for providing the combined arms maneuver with a more efficient and reactive combat support.

As far as NRBC is concerned, although the remote detection capability is only at its very beginning, the next fielding of new assets, combined with a renewed doctrine, will allow a better reactivity and a greater proximity, in particular regarding the units decontamination.

All things considered, the combination of more powerful assets, with modern CIS tools and a more flexible organization increasing the freedom of maneuver, should enable the AGESTER function to be better associated first to the preparation of the combined arms maneuver and then to its conduct. The ground space management function should accompany better than ever the combat units engagement, in particular in urban areas.

1 AGESTER (ground space management) : an operational function regrouping the engineers' assets and those of NRBC specialized defense.

Evolutions
of the CIMIC operational function by 2010

Primarily committed within the framework of the violence mastering operating mode, land forces have been systematically accompanied by " CIMIC[1] " operations during their missions. However, even if their presence is more unassuming, CCM personnel are also operating within the framework of force coercion, especially when assisting populations. Globally, CIMIC missions contribute to reach political objectives, facilitate the action of the force, and aim at accelerating the end state of a crisis and at preserving national interests. However, the fielding of new technologies, in particular in terms of CIS, is likely to give them a new orientation.

BY LTC DANIEL FISCHER, CREDAT (FRENCH ARMY REALISATION AND DOCTRINE STUDIES CENTER)

Few foreseeable changes in terms of missions

During the decade to come a CIMIC maturation will lead in fact to refocus on the roles of the armed forces.

In terms of missions, first priority will remain initially to force support (especially by contributing to its protection), then to the civilian environment support as a second priority ; this latter being even more expressed in the commitment of experts within the framework of the city's life rebuilding.

Most of the missions in this function are specific and of short duration.
In a " *Commitment first - Withdrawal first* " logic, doubled with the concern of not replacing civilian organizations, the commitment's duration for national CIMIC in overseas operations (OPEX) will take place over much shorter periods than during the previous decade. Thus, they will even more quickly be replaced by traditional French or multinational civilian co-operation.

Means rationalization

In addition, we will most probably put an end to the humanitarian and utilitarian orientations (use of assets according to the objectives and no longer to the forces' capabilities) through the rationalization and limitation of assets. In fact, armed forces will only meet vital requirements in case of top emergency.

As regards influence policy, the interdepartmental coordination will remain difficult. Nevertheless, for the armed forces, and the CIMIC in particular, the so-called influence actions will certainly be more clarified and of a more opportunist nature. Taking national interest into account within a multinational framework remains acceptable and is carried out by all nations.

It is not a matter of exacerbating a counter-productive competitive spirit, but to ensure that our interests will be legitimately taken into account equal to the agreed sacrifices and efforts.

Finally, CIMIC mission planning will logically have to more include " *civilians* " and to be directed towards a " *return on investment* " improvement and towards the preservation of assets on a given territory.

Increase of the CIMIC function' role in terms of employment

Within the framework of its contribution to reach the expected end state, the CIMIC function will be more engaged in the force's environment management, in its broad sense. Often present prior to commitments, it will have to operate in a more coordinated way with the actors of operational communication (COMOPS) and of local communication, and with all psychological and/or special operations. Moreover, taking some (cultural, religious, social, psychological, historical, etc.) sensitivities into consideration is facilitated by its theatre expertise and it provides the combined-arms commander with a specific light on the force's environment, in particular during multinational operations.

CIMIC presence in force coercion

Very present within the framework of the violence mastering and aid to populations operating modes, the CIMIC function will also be represented in force coercion. Indeed, to limit collateral damages at the maximum, the population factor and its concrete aspect, the aid to populations becomes one permanent factor of these commitments, as confirmed by the most recent ones.

Taken into account both during force planning and building up, this expertise is also taking part in the definition of the rules of behavior that each soldier has to apply on the considered theatre. It takes part in the enrichment of documentary databases on human and cultural environments and it draws the attention of military authorities on the necessary protection of significant civilian organizations and facilities.

Choosing an offensive and/or defensive alternative

Technological improvements, in particular battle space digitalization, which favors a more larger and more complete information's circulation, permit to direct CIMIC towards an offensive alternative - influence policy - and/or defensive -

information gathering -. In the first one, the displayed objective is to influence significantly the perception of the force's image by the local population by combining CIMIC actions with PSYOPs and OPCOM ones. If this choice may prove to be effective in the short term, it seems more risky in the long term. In the event of failure, it could notably involve the risk of jeopardizing the force's reputation[2] for a long time not only towards the population but also towards multinational authorities, NGOs, etc...

The second option of this alternative - more defensive - seems to take a better advantage from new technologies to the benefit of information gathering for the force. In particular, digitalization aims at gaining a decisional superiority

thanks to the acquisition of informational superiority and at establishing closer links (while remaining unobtrusive) between CIMIC and the " *intelligence* " function (especially concerning the civil environment of the projected force).

1 Though too restrictive, this terminology has been just replaced by "civilian-military co-operation" - CCM - or, in order to be read more easily by our allies, by "CIMIC".
2 Coalition achievements during the early stages of the current conflict in Iraq do not seem convincing and to argue in favor of adopting them by the French Army. Nevertheless more detailed analyses will have to be carried out concerning the lessons learnt from this conflict.

Keeping their primary missions of supporting forces and civilian environment, CIMIC will keep enabling the force to better grasp the environment in which it operates, within the framework of violence mastering operating mode, as well as of force coercion to a lesser extent. However, because of the increased capabilities for information flow granted by new information systems, the goal of their action could be more directed towards supporting the force's influence policy or information gathering.

In that option, the possible consequences in terms of efficiency and credibility of the function will have to be closely tackled.

ThomasSAMSON/ECPAd

CIMIC will keep enabling the force to better grasp the environment in which it operates.

The revolution
of force systems

Since one decade the geopolitical environment has been drastically changed by the collapse of the Soviet block.
But the technological environment has also been subject to deep evolutions, notably concerning the information networks and robotics. How will these new data be integrated in the conception of the future weapon systems ?

Research : The state organization responsible for Armament programs (DGA) has just publicly presented one of its futuristic project about the " Air-Land operational bubble " (BOA). How is emerging that concept ?

Christophe Jurczak : Since five years, DGA has conducted a deep restructuration. Previously, our prospective thinking was relatively compartmentalized. It was organized around weapon systems designed for one or another service : a new MBT, a new aircraft, aso...

After the collapse of the Soviet block, we dropped that logics of means and set more transverse objectives for us : to build a " *capability* " for example mastering the Air-Land environment. Thus, from now on, we are reasoning in terms of " *force systems* ". Each of them is placed under the responsibility of an " *architect* " whose mission is double : to prepare the future by imagining what will be the technological and geopolitical environment within thirty years and to manage the transitions as the years go by with the help of systems as flexible and modular as possible.

When did you start thinking about BOA ?
C.J. : In 1998. We had established a working group with 15 officers and 15 engineers from the DGA to imagine what would be the so called " *contact* " missions in 2025 : MBT or infantrymen fighting...

According to the technological evolutions, it appears to us that, tomorrow, it should be possible to attack an adversary without being in direct sight with him. How to do it for a tank ? The idea consists in using a UAV, a small autonomous aircraft offering a remote sight. The information is then collected by the firing platform which, eventually, triggers the launching of a missile against the target designated by the UAV. As we are firing more afar and as we are, for example, screened by a hill, the tank and its crew are better protected.

Are you captivated by UAVs and other robots ?
C.J. : No, these ones are only but means with emerging future capabilities.

The true originality of the BOA concept is the separation of functions : the sensors can be physically separated from the system that produces the effects ; various functions can be fulfilled by several platforms of a fighting section. Today it is still difficult to imagine that, but the goal is to use the information technologies, in the broadest meaning, to connect these platforms into a network, to constitute what we called a " *bubble* " and meet the requirements as they are imagined by the " *operational* " people.

To give some stuff to what is still only an idea which external helps are you requesting ?
C.J. : As soon as the concept has been formalized, we launched studies with the industrialists. These studies are still only " *paper* " works, intended to validate the technological evolutions indispensable for a future system. A study plan exists for an approximate 60 million euros budget and we decided the year 2005 or 2006 as a deadline in order to be able to let the whole project to nurture.

Have you call on the services of the civilian research ?
Jean-Jacques Gagnepain : No, not yet. In the academic research, at CNRS or in the universities, we find only few competencies as regards strategy or even systems... That notion is sometimes taught in some engineer schools and almost never in universities.

Compared to the Anglo-saxons, we have there a serious gap. In addition, the scientific research world has not yet performed the same type of evolutions as the armed forces, the great disciplines set up by Auguste Comte are still structuring the academic research. This latter is, in my opinion, obliged to evolve in a more transverse way : it is now on this track, even if it is still a long way to go.
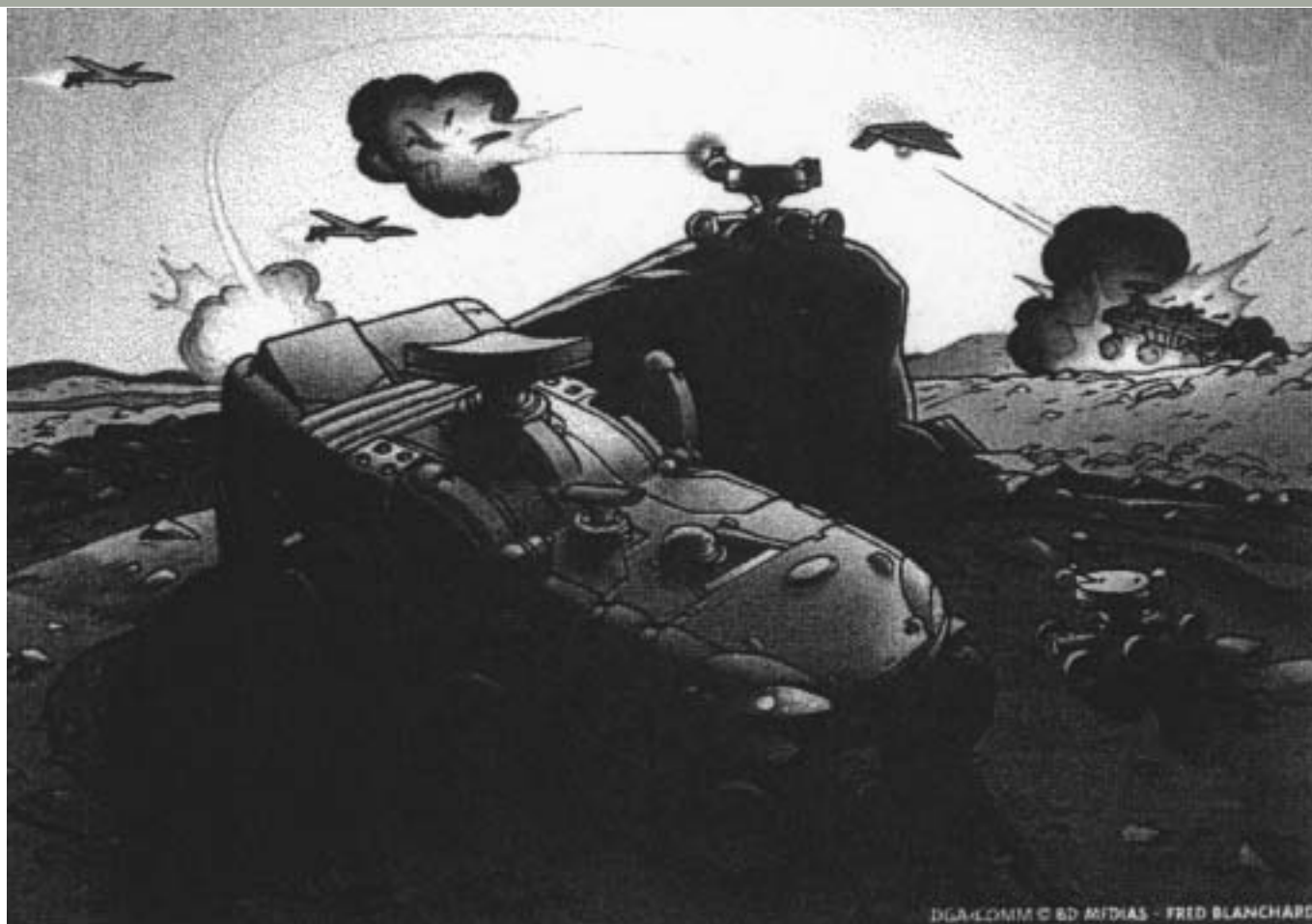
To communicate about its orojet of Air Land operational bubbe (BOA), DGA used the aesthetics of comic strips...

Is this the reason for the decrease of budgets devoted by DGA to the academic research ?

J.J.G. : Partially yes. In the years 1970-1980, DGA was providing important means in order to have some studies developed by public laboratories. Then, during the 90s, the internal reorganization naturally implied our withdrawal. In that phase which is starting, we wish to develop again the links with the scientific world by providing the necessary means, mainly in research projects but also through funding master thesis, etc... We still need to remove administrative obstacles, which is now possible with the evolution of the public contract Code and we need to lighten our procedures. I hope that we will succeed soon.

For BOA, for example, what type of studies do you intend to launch ?

C.J. : We identified several technological " *hard points* " : robotics, telecom, etc ... For example, in the development of small scale UAVs, almost everything has to be invented.

So, we started a study program in which the universities and the engineer schools will intervene through a competition with 1.5 million euros in prizes : the goal is to demonstrate in three years from now that a tiny UAV around 20 centimetres in size is able to make autonomous flights in urban areas. We don't ask universities to make a perfect tiny UAV, but to find original solutions to unsolved problems such as the flight through gusts of wind. If they bring us solutions, all the best ; if there is none, that will be also an answer !

What is the main problem to solve for developing a concept such as BOA ?

C.J. : To succeed in managing the information flows. The first experiences demonstrated it : on the battlefield, a soldier who is receiving images and pieces of information from his leader or from his subordinates tends to stop moving.

He is waiting for the next image which should be better, for the next orders which should be more precise... But man must remain at ease to bring his own added value especially in situations when stress is so important.

Our main concern is to succeed to master that information at tactical level thanks to automatic processing systems, and to adapted interfaces.

J.J.G. : Concerning that point, I am convinced that researchers in their laboratories, at the CNRS and in universities, are ready to work on topics linked to Defense, notably in the information and communication technologies.

> **the goal is to demonstrate in three years from now that a tiny UAV around 20 centimetres in size is able to make autonomous flights in urban areas.**

"National Defense" R&D
In the whole public funding for research and development,
the national defense share was almost divided by two in a decade.

Research budgets : a permanent decrease

40 %

35

30

25

20

15

1985   1990   1995   2000

100 %

90

80

70

60

50

40

30

20

10

Defense related contracts

Public funding

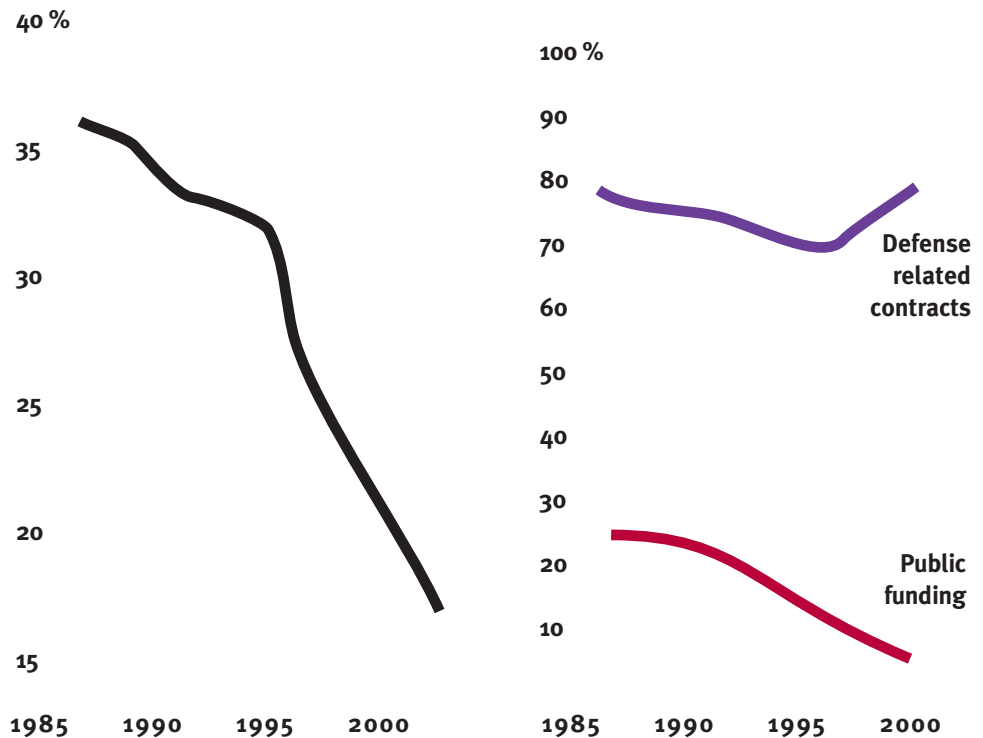1985   1990   1995   2000

" Companies " R&D
In the internal funding , the public share for research and development of the French companies decreases by one half between 1988 (red curve) while the ratio of Defense related contracts evolves very few (purple curve).
The public funding taken into account there does not include neither the European Union programs, nor the contracts with international organizations such as the European Space Agency.

Jean-Jacques Gagnepain,
after being the CNRS department director for engineers sciences, is now the scientific advisor for the DGA.

Christophe Jurczak,
Armament senior engineer, he is within DGA the deputy architect of the "Air-Land environment" force system.

Abroad, similar studies are developed mainly in the United States. When you see the size of the American investments don't you fear a technological decoupling with the allied defense forces ?
C.J. : The Unites States planned to demonstrate in two years the feasibility of a concept close to the BOA, with a first operational capability in 2010. Provided with a 150 million dollars budget for the demonstration phase, the American project has, in fact, a far larger scope than the BOA and concerns all the operations in a theatre. At European scale, cooperation is essential. It is out of question that we succeed alone in developing such a concept : we cannot afford it and it would not be efficient for the interoperability of the systems. France, Germany, Spain, Italy, the United Kingdom and Sweden signed in 1998 a LoA aiming notably at ensuring a coordination of the military research policies and the harmonization of the operational needs. It is up to us to create the European dynamics on this topic before 2005-2006, the critical milestone for the BOA, which possible fielding is expected around the years 2015-2020.

Interview collected by Gérard Chevalier.

The complexity
of weapon systems

Modern weapons continuously increase in complexity. In Afghanistan, almost 85% of the bombs used were guided compared to only 10% during the Gulf War. In order to answer a multiform and moving threat within a very constrained budget context, the weapon systems, and especially those developed in Europe, are resulting from numerous complex factors. Therefore they require a global approach, as when strategy is dealing with great military, economical or political issues.

Before going further it is important to define some terms. The system can be defined as a gathering of elements, each of them having a specific function and whose combination, following one process, is aimed at carrying out a mission. The complexity is to be understood as the degree of uncertainty and risk which is intrinsically linked to the system or to its development manufacturing. This article will try to draw a picture of the substance of this complexity in order to better examine the means, as a military, to grasp its consequences and thus to succeed in integrating weapon systems.

BY MAJOR Bruno PARAVISINI

Systems which are necessarily complex

Despite the ever increasing possibilities offered by science, weapon systems still have a significant level of complexity. Two main reasons exist for this. The first one is related to the joint and multinational nature of engagements and the second one to the necessity, for companies, to permanently innovate in the field of weapons.

Current operations are essentially carried out within a joint framework, and often within a coalition, within or a UN or NATO framework.

Consequently, weapons systems must be adapted to this fact. For example it must be possible to integrate a ground-to-air device to other equivalent allied systems without forgetting the complementary ground-to-air systems. This system has to take into account air movements, and of course the threat under all its forms. All of this entails a very high degree of coordination that is ensured by interfaces able to dialog with all participants on the theater. In addition, it should be noted that the multiplicity of procedures, but also the very cultures of each country, add an additional layer to this complexity.

On top of this picture come the effects of the ruthless commercial war conducted by the armament world companies. It is legitimate to wonder why companies innovate. Why a more simple system should not meet the operational requirements when considering the average level of the threat ? One can recall that the strategy of the former Soviet Empire was aiming at destroying the opponent by saturating its defenses thanks to the employment of an enormous mass of equipment and that the manufacturing simplicity was the sine qua non condition for success. Today, for our companies, the deal is different. Innovation is an integrant part of their strategy and their dynamism in this area conditions their good health. They must anticipate on tomorrow technologies and integrate them at low costs. In this way the matter is to make weapon systems as resistant as possible to obsolescence. Therefore, and we should not be wrong about this, this ruthless competition requires, from the part of industrials, to develop the mostly technologically advanced systems able to

compete with equivalent products, notably American, on all aspects.

Adapting to the constraints of modern warfare combat and competing with other products available on the market are the essence of the challenge that has to be accepted by weapon systems. Today, if technology is progressing rapidly, the threat and the economical conditions have also shown their capability to change quickly. It is in that context rather difficult to apprehend that weapon systems have now to be developed.

The development of weapon systems, a complexity factor

From the arrival of the first tanks during WW[1], to the blitz breakthrough of the Panzer divisions in May 1940, three decades were necessary to the definition of the weapon system that is represented by the tank. One can vaguely have the feeling that, despite tremendous progress of science and of the capital represented by years of military thinking, the arrival of a new weapon system is not the result of a natural process. If today budget constraints issues are added on top of this, this entails that often weapon systems have to meet, in a Cornelian scenario, very strong requirements in terms of performances and low cost development. Therefore, a great number of modern weapon systems have a complex development, and this mainly for industrial process, delays, costs, technology and performance reasons.

The complexity reasons are first linked to the industrial processes to be implemented. It is rather obvious that the days of a purely national industry are over. At the same time, it seems that no area should be left aside a priori, as this would be a loss of autonomy. Therefore, programs are often conducted within an international cooperation context in which all participants scrupulously look after the fulfillment of expected benefits. The industrial arrangements necessary for the conduct of programs are thus difficult to set up. These arrangements often generate extra costs that sometimes "oppose" generally accepted ideas about the advantages to work in cooperation.

In a second step, questions about time lines and time limits are extremely sensitive. It is recognized that during the very first steps of a program, which correspond to the definition, quite 70% of the costs are committed. It is therefore easy to understand the effects of successive programs' adjustments or the ones of equipment specifications' modifications, even the apparently insignificant ones.

Thirdly, the product in itself contains a part of risk, which is the result of the compromise between the selected technology, the performances and the accepted costs. This is strongly linked to the long development turnaround time that impose to cope with emerging technologies likely to reach a sufficient maturity level at manufacturing time.

Progress in component miniaturization is often a good example of this, when it is the case of lodging powerful calculators into the limited space offered by a missile body. Program contractors in a program know very well the share part of the benefits expected from a successful projection as well a the accepted very high risks they take on the contrary.

The management of all these factors requires a permanent strictness at all levels. The notion of compromise is omnipresent and is essential in order to achieve integrating the adequate weapon system at the appropriate time. For example, no one envisages the fielding of new infantrymen equipments without seeing, in the same time, the arrival of corresponding

communication systems. Undoubtedly, mastering this complexity is a real struggle that presupposes to master time for a sound use of budgets in a correct manner. This requires from executives some responsibility commitments that are not deprived of risks.

Taking the necessary decisions is a great responsibility in which military participate. And this rightfully, as man continues to be at the center of systems generating an extra layer of complexity which should be apprehended at best.

Taking into account the human factor

The average technological level, which has significantly been increased, has partly led to

The education followed by a regular training are the sine qua non conditions to efficiently set up and implement weapon systems.

the professionalization of armies, i.e. a reduction in strength. This new organization must allow to have fully competent and available personnel during enough time to make profitable often long and costly training education. If education followed by a regular training are the sine qua non conditions to efficiently set up and implement weapon systems, considering the ergonomics issue related to equipment hais also a very important aspect.

Efforts have been accomplished on the part called man-machine interface. This interface is the part of the system where man intervenes in any way. It can be a monitoring screen or a joystick. The efficiency of the weapon system is often dependent upon the quality of this interface. The general public computer systems are the best example of progress made in this field. Today, most of the software are very accessible as designers paid lot of attention to make their products very " friendly ". For a weapon system, all the combat conditions are coming on top of the difficulties pertaining to its implementation. Stress, cold, tiredness are as many additional handicaps. Therefore it is essential to adapt the weapon system to human factors by maximizing comfort and friendliness possibilities.

This adaptation presupposes a good knowledge of manhood, of his physical, physiological, psychical characteristics as well as of his culture. Therefore, it is necessary to have a

real human model. Man is then considered as a system as such, whose behaviorism laws must be defined. For example, it has been noticed that, in front of a screen or an image bearing no particular information, a priori specific, and on which however a research must be carried out, the human eye comes back to a reading reflex. In this way, we would tend towards starting to search on the top left part of the screen whilst an Arabist would start on the top right part of it. Some weapon systems require going even further in that study. This is the case with systems that are called with man in the loop. Optical fiber guided missiles offering targeting facility designation at the right time by an operator who, on a screen, completely monitors the missile flight, are a perfect example of that case. Beyond the best inclusion of the human-machine interface, the difficulty for militaries, in this case, is to define, thanks to a doctrine, the limits and the interactions between the operator and his external environment.

Knowing that the operator will sometimes only have one fraction of second to designate the target to the missile, the results and consequences of the fire will not always be guaranteed. The global approach of such a system requires to include the political dimension of the fire as well as the emotional reactions of the operator. The complexity can therefore be easily understood.
Man definitely remains at the center of the weapon system. But recent

evolutions show that he will always have to react with an utmost speed and a great accuracy. The interweaving of armies and of their weapon systems on the battlefield will become more and more complex to manage and this really shows the relevance of studies dealing with the human-machine interface part.

Mastering complexity is a major challenge for militaries who have stressed this point many times. Facing new types of operations since the fall of the Berlin Wall, they have perceived very quickly its necessity. The other determining factor when considering complexity is the general downsizing of budgets devoted to defense. If the perspective of an escalation up to the extremes, described by Clausewitz is somewhat fading, the threat is omnipresent and recent conflicts, especially the future ones those, show that defense cannot be missing a certain level of financing. In particular this level must make possible to ensure the reliability of systems in order to offer the expected operational availability.

The best use of budgets goes through mastering the complexity of weapon systems. It is the case of sizing their financial impact at best, which in particular imposes a cost approach over the whole lifetime and not considering only the purchase cost. To reach this mastery it is essential to use databases that are becoming, among others, through the use of statistical tools, the lights of the past in order to shed light on the future.

In a second stage, it seems important to scrupulously act within the long-term directives that are given in terms of defense while favoring a top down approach. These ones will indeed permit to determine the interfaces that should fit weapon systems in order to be integrated, in the best harmonious way, within the defense global system. To these ends, we should take care of the national aspect as well as of the international one, which is the preferential framework of all major operations. Therefore, the fact of taking into account weapon systems in their global nature would be devoted to meta systems i.e. systems of systems. Absolutely essential, these meta systems would come to federate all weapon systems in order to optimize intelligence coming from them and to rapidly deliver deliver, with a great accuracy, the fires necessary to the success of the mission.

A politically united Europe will there find a wonderland to express its role in the field of common security and defense.

Digitization within the US *Army*

The battlefield Digitization

Digitization is the instrument enabling the military leaders to gain informational superiority. It aims at providing the chain of command with the capability to collect, process and exploit the information that is useful to its mission. Being aware of friendly and enemy situations together with the speed of the decisional cycle constitute its two pillars. This concept requires the integration and interoperability of all the weapons, information, communications, and logistics systems with the sensors, all of them being melt into a " *system of systems* ". The American military decision-makers expect that in the very short term, it will be possible for them to communicate with anybody, from anywhere, at any moment, with any mean of communication while leaving only a reduced electromagnetic signature. Concerning the command and control area, they would benefit of an almost real-time update of the tactical situation. The sharing of a common data base should facilitate the decision-making process, and the almost immediate connection between the sensors and the " *shooters* " should increase the forces' lethality. Thanks to awareness and speed, the armed forces should be able to do better with less manpower and equipment.

BY LIEUTENANT-COLONEL (P) RONALD TILLY, FRENCH LIAISON OFFICER AT THE US ARMY SIGNAL CENTER (FORT GORDON)

The US ARMY PROJECT

The *US Army* project takes place in a more general framework, the Defense Department's one, which goal is to build up an " *info sphere* ", the GIG (Global Information Grid). GIG should be constituted by the merging of the armed forces CIS (Communication and Information systems) and their connection towards the civilian ones. GIG should allow any joint task force to deploy to any place in the world without having to worry about any connection requirement (plug and play versatility principle).

Info sphere is at the same time the support and the engine of this project. The support because it is on its networks that information will travel, and the engine because it is the info sphere which will provide the tools necessary to disseminate the common tactical situation as well as the collective planning assets.

Transformation Strategy

The concept is based on two major projects, WIN-T whose fielding by 2008 will modify the area meshing principle and the JTRS (*Joint Tactical Radio System*) radio system, multi-band, multi-mode software programmable, high rate data radio which should allow brand new possibilities of joint communications.

WIN-T *(Warfighter Information Network-Tactical)* **is key to the Army digitization project. Its principal role will be to integrate all the battlefield networks within a global architecture. The resulting power will make it possible to exchange multimedia and secured data from any place in the world, even when on the move. By offering to the combatant a capability similar to the Internet, WIN-T will achieve the signal branch's goal : to federate myriads of networks and associated systems which currently break up the chief-to-subordinate links. It will integrate these networks into a military Intranet, which will be connected to the world wide net thanks to the military infrastructure network.**

JTRS *(Joint Tactical Radio operator System)* **radio system is a joint program for which US Army is in charge. This programmable radio guarantees interoperability amongst US Services. That should allow to reduce the number of radio sets from 750 000 to 260 000. JTRS will be able to work in 14 wave types among which the broad bans network WNW** *(Wide Networking Waveform)* **which should become the military standard for wireless communications. The program has been divided into several blocks. Block I or Cluster I relates mainly to the US Army. It will equip combat vehicles and aircraft while cluster 2 will be the portable version. Cluster X will meet the** *Objective Force and Future Combat System's* **requirements. The objective being to be able to integrate this radio system within the** *Land Warrior* **system as well as into the land sensors, the small tactical UAV and the UGV.**

The US *Army* current situation

In the domain of equipment, the IIIrd Corps (Fort Hood, Texas) is the major unit that is currently being digitized. Two of its divisions are already equipped and trained at the *Network Centric Warfare*. The entire Corps digitization should be finished by 2004. Two autonomous brigades " *Stryker Brigade combat teams* " have been digitized as well.

The communication systems

Info sphere is supported by the communication system whose architecture is centered on the Tactical Operation Centers (TOC-centric architecture) made up of five sub-networks :
- a WAN (Wide Area Network),
- a tactical Internet network,
- a combat radio network,
- a TOC to TOC data transmission network,
- the GBS (*Global Broadcast Service*).

The WAN (dynamic network)
the WAN provides the TOCs with telephone communications, data transmission, collective planning and videoconference capabilities.

The Internet Tactical network
This network is a data transmissions mobile network based on secure UHF radio systems with frequency hopping capability, allowing only data exchanges according to the multiple access time-sharing technology.

The combat radio network includes three systems :
- a VHF tactical radio communication system for the combat units,
- an HF tactical radio communication system,
- satellite telecommunication tactical portable stations.

A TOC to TOC data transmission network
This network provides data transfer between the TOCs. It is based on UHF radio systems with dynamic networking, used only for transferring data between battalion and brigade TOCs.
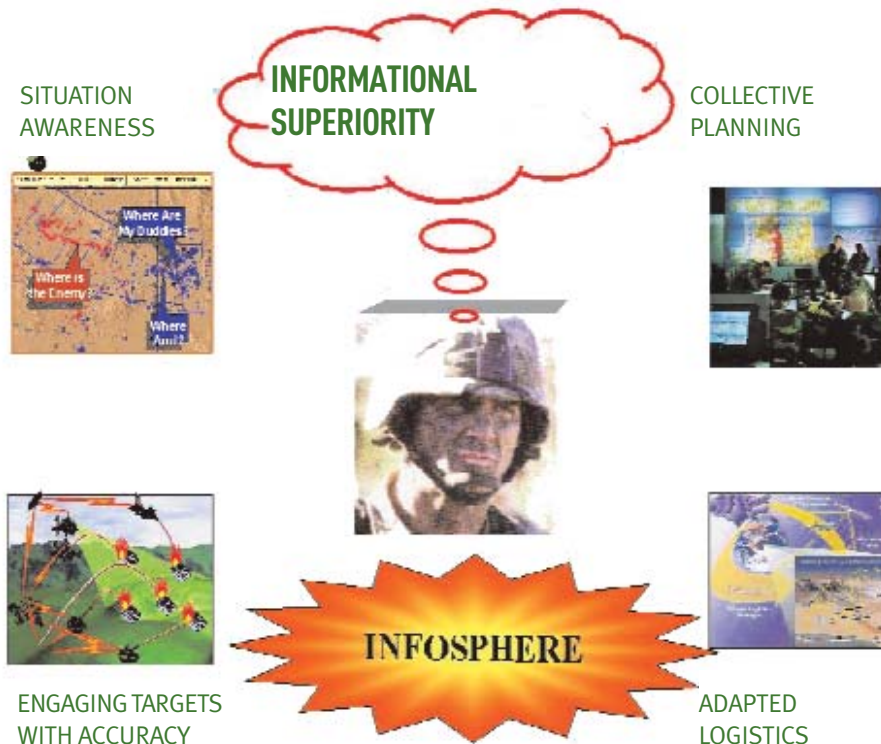
GBS (*Global Broadcast Service*)
GBS is a joint program for high rate data diffusion by satellite. It aims at broadcasting images, videos and data towards a large number of units whether in garrison, deployed or when on the move. The injection sites feed a data base with tactical, technical and general information (weather forecast, imagery, charts and graphs, information, medical data, access to governmental and commercial Internet sites, situation updates provided by the various information systems of the armed forces). GBS collects, processes and organizes those data and then disseminates them, according to a pre-established plan, under the form of extremely varied programs. Each addressee has a specific routing address which guarantees, on the one hand the security of the system and, on the other hand, the fact that each one receives only the information he is interested in. This avoids the over-information problem. Information can be read through an Internet-type gate.

The information systems

The info sphere engine is constituted by the information systems entire collection. Digitization is present down to the platforms level (battle tanks, armored vehicles, helicopters) by means of the FBCB21 system. It is a mix of Regimental Information and Terminal Information systems, it aims at improving data exchange and processing capabilities within the air land battle general framework from the brigade to the squad level. It collects the battle field information and reroutes it towards the staffs.
A digitized division requires approximately 2 000 FBCB2. Battalions and above levels are equipped with the ABCS (*Army Battle Command System*) Information system which is the generic name for a group of five Information Systems (IS) dedicated to specific operational functions from Corps to battalion.
- MCS² is directed towards maneuver planning and conduct. It provides a real time image of the tactical situation and makes it possible to hold command meetings by videoconference ;

SITUATION
AWARENESS

INFORMATIONAL
SUPERIORITY

COLLECTIVE
PLANNING

INFOSPHERE

ENGAGING TARGETS
WITH ACCURACY

ADAPTED
LOGISTICS

data flow necessary to the diffusion of the tactical common situation which sometimes destabilizes the system. When on the move, it proves to be also very tricky.

The second recurring difficulty is that of the integration of the various information systems. The ASAS system is the one which encounters most problems, thus making the enemy situation more difficult to assess and requiring many tiresome manual inputs to update it.

The third problem relates to recruiting, training and establishing staff loyalty from high-level operators because the implementation of some pieces of equipment is complex and requires advanced know-how.

- AFATDS[3] is dedicated to planning, coordinating, and controlling land, air and naval fires in a given maneuver area following an automated assessment of the targets' value. AFATDS is interoperable with the corresponding Navy, Air Force and allied Information Systems.

- CSSCS[4] is the logistics Information System. It takes into account the supply, repair, medic, and human resources aspects, and integrates them in the logistics movements and deployments planning process for all current or coming operations.

- AMDPCS[5] is dedicated to air defense coordination. For this reason, it integrates the Information Systems of the air defense weapons systems, sensors and C2. This system allows air defense planning : it keeps up to date the air situation, disseminates air and ballistic warning messages. It is interoperable with corresponding Air force and Allied Information Systems.

- ASAS[6] is the Information System dedicated to Intelligence and electronic warfare. ASAS analyzes

information coming from all the battle field sensors and produces intelligence estimate and analysis, warning messages and potential target lists.

The common tactical situation is prepared by drawing information from a common data base shared by the various Information systems. Data transmission amongst the various battalion and brigade TOCs is ensured through a high rate radio system, the NTDR[7] which through a router is able to exchange data with the other radios assets of tactical Internet.

CONCEPT IMPLEMENTATION DIFFICULTIES

At the current stage, digitization enables the chain of command to have at its disposal a real-time friendly situation. However, the difficulties to integrate the information systems as well as the tactical Internet network's insufficient speed affect the common understanding of the situation.

As a matter of fact the insufficient speed of the tactical Internet does not permit to convey quickly enough the

By recommending awareness and speed, the military leaders fit very well in the society in which they live, i.e. the one that sees the exponential development of the Internet, of the multi-media equipment, in one word the information society in the broad sense of the term information. Confident in the added value brought by digitization from which they already collect the first results, they invest in time and money in order to implement the project.

The transformation undertaken by the US Army is a complex process because the development of a "system of systems" implies the simultaneous conduct of many projects that, are developing at different rhythms, but that are mutually essential to the success of the overall project. Digitization is at the very heart of this gigantic enterprise.

1 Force XXI Battle Command Brigade and Below.
2 Maneuver Control System.
3 Advanced Field Artillery Tactical Data System.
4 Combat Service Support Control System.
5 Air Missile Defense Planning and Control System.
6 All Source Analysis System.
7 Near Term Digital Radio.

The British Army by 2010

In terms of equipment and commitment, the 2010 *British Army* should be rather different from to-day. Unlike other Western armed forces, digitalization is not a determining factor for short-term changes. Major digitalization impacts are not awaited before 2015/2020. On the other hand, it was necessary to have the land tool evolving in order to make it consistent with the expeditionary vocation of the British armed forces.
The goal is to have a better balanced land force including quickly deployable forces capable of rapid effects as early as 2010.

BY LIEUTENANT-COLONEL CONSTANT, FRLO TO DGD&D

For three years, the works of the *Directorate General of Development and Doctrine* (DGD&D) have mainly dealt with the definition of new capabilities tending to fill a " capability gap ", which has become too patently obvious within the *British Army*. Indeed, organized around two armored and mechanized divisions, one airmobile brigade - still building up - and light infantry battalions, the *British Army* did not have the so-called " medium " capabilities (*medium forces*) able to combine speed of deployment and significant effects in the theatre. At the same time the expeditionary vocation of the British armed forces was reasserted. By simplifying the issue to an extreme degree, the equivalent of our Light Armored Brigades (BLB) was lacking within the capabilities' range of the *British Army*. But by reviewing this concept, the British were able to give it a new vigor by taking advantage of the most recent technological developments. Consequently, the tool being forged for 2010 deserves all our attention. In order to outline its scope and to understand its use, we will try to answer three simple questions : Within which framework ? Which tool ? Which action ?

WITHIN WHICH FRAMEWORK ?

Several factors have appreciably distorted the operating environment of the British armed forces these last years. It is that evolution which resulted into the definition of new capabilities.

Determining factors are :
First of all, in the 2002 augmented issue (*SDR New Chapter*) of the *Strategic Defence Review* (SDR), the capability to deploy rapidly into an overseas theater with significant capabilities has become a key element for the commitment of forces. The principle consists in avoiding escalation by " nipping the problem in the bud " thanks to important forces. There is the officialization of the " the rapid effect " doctrine developed internally by the *British Army* two years before.

Within the same framework, the expeditionary vocation of the British armed forces has been constantly reasserted. Then the *rapid effect* seems to be the major contribution of the land component to the joint effort. This latter one is confirmed as the natural and inescapable framework for the commitment of forces, as well as multinationality when building up force elements.
Finally, it is necessary to take the threat's fundamental evolution into account.

Indeed, risks are multiform from now on and lots of them remain badly identified. As an answer, the range of missions and of possible commitment theaters has spread to an extreme degree. Thus, it is necessary to promote the modularity of assets in order to tailor the best tool fitted to the situation. The future commitment's framework is thus characterized by its dubious, moving and unforeseeable character. In addition, it is necessary to take into account the non linear character of the future battlefield (*non linear battlefield*), today considered as a fact. The notions of " deep ", " closed " or "rear" are still relevant but apply to "bubbles" or parts of the battlefield in which the tactical action is carried out.

A raging obligation for " the speed effect ", an expeditionary vocation, a multinational and joint framework, modularity, and the multiform and unforeseeable characters of a threat

exploiting a non linear battle space, all of these elements resulted into reconsidering the current balance of capabilities mainly sized by the cold war, the empire wars and the rule of law in Northern Ireland. In a word, we needed more **agile** forces in order to meet these major evolutions.

WHICH TOOL ?

Before detailing the specific components of this land force, it is advisable to outline its global profile. Two major features characterize the portrait of the 2010 *British Army*.

Of the one hand, it will first be a **balanced** force. This balance is a general characteristic applying to four major fields (the British are talking of the 4Bs, B for *Balanced*).

• A balanced force between heavy, medium and light capabilities[1].

• A balanced force between combat, C2 , CS and CSS elements.

• A balanced force as regards the number and types of major units. The division level remains relevant, but the brigade becomes the indivisible tactical pawn.

• A balanced force between regular and reserve units.

Obviously, the first balance is the driving change since it prepares the arrival of medium forces. Consequently this emergence entails a redefinition of the heavy and light capabilities.

On the other hand, the purpose of this tool is above all to achieve **tactical success** with an **operational impact**, thus taking part in the strategic objectives. This tactical success is imperative whatever the selected operating mode or the type of threat : so, high intensity warfare against an equivalent enemy (*warfighting*) remains the reference and definition standard of forces.

Thus, the 2010 *British Army* will be a better balanced, agile and reactive force but the single reference of which will remain the requirement to win in high intensity warfare.

Let us now detail these three key capabilities - the three pillars for " *tactical success* ".

The heavy or armored capability (*heavy forces*) is characterized by restricted deployment options : rail or sea.

In 2010, it will rely on major existing equipment : Challenger MBT, Warrior AIFV, AS-90 155-mm SP howitzer. It is the key capability allowing to dominate high intensity warfare.

Its effectiveness should be optimized, not by replacing equipment, but by building up medium forces which will complete its action and through the airmobile capability focused on the Apache, assumed to give it more reactivity and extending its destruction capability into the depth.
From then on, an *heavy forces*' isolated commitment is very unlikely. In high intensity, whatever the size of committed forces, this capability is about to be the " *hard core* " of the force element which is deployed. This principle should not be discussed again before 2020.

Thus, by 2010, the *British Army* should line up an armored division, very similar to the current 1 (UK) armored division regarding its size and equipment.

The medium capability is characterized by the possibility of being partly deployed with C-130 and entirely deployed with C-17. This major constraint in term of weight and size should not be fulfilled to the detriment of the force lethality or protection. Thus, it is here a matter of solving the difficult *rapid effect* equation, i.e. how to deploy rapidly and be able to apply very significant effects in the theatre.

Part of the answer is included in the definition and in the procurement of a family of new platforms - called FRES (*Future Rapid Effect System*)[2]. The system's development is in progress, and the British seem looking for the procurement of a modular-armor and rubber-tracked vehicle. The whole set, ready-to-use, whatever the fitted types of turret or air defense weapons - should remain under the maximum weight of 17 tons. The support of FRES units should be carried out by a new artillery system (without a FRES platform), the LIMAWS. This weapon system - with the same constraints as FRES - should rely on a 155-mm gun version and a rocket version, the LIMAWS (R). In both cases, these are radical new weapons for the *British Army*.

This medium capability, or FRES, is the key element, which gives to the British capability spectrum its new balanced aspect. Its interest is relevant at any moment of the crisis' cycle.

In the early stages, it allows to intervene quickly and significantly, thus supporting a rapid solution. If heavy forces have to be deployed, the FRES capability prepares for their commitment, and then supports their maneuver. Eventually, it is an essential tool for a stabilization phase.

Thus, the FRES capability is characterized by its capability of being committed alone or in reinforcement, and thus by its cost-effectiveness during the whole crisis' cycle. Setting up a FRES major unit is planned by 2010. The currently mechanized 3 (UK) Div. should inherit this role.

Light capability (*light forces*) is a constant of British structures. A rich history based on the empire and more recently on the situation in Northern Ireland has created a significant set of forces[3] but today not easy to employ with the other capabilities. Above all, it was appropriate to redefine its role and to widen the range of its missions.

This capability is characterized by its speed of deployment and its aptitude for dismounted combat. But it lacks protection, fire power and tactical mobility.
Acting in an autonomous way, it has to control difficult grounds (*complex ground*) in high intensity warfare. It is

also the major element for peace support operations.
In the future, they will provide FRES units with an essential support by preparing their commitment, by informing them and protecting them. A heavy/light pair is also quite possible. The future of this couple lies mainly in urban warfare, where light forces are the essential complement to MBT.

Thus, the *British Army* in 2010 will be organized around three capabilities : heavy, medium and light ones. The first and the last one will have neither their structures nor their equipment radically modified. Nevertheless the development of a medium capability will increase their cost-effective aspect by diversifying their employment possibilities. Above all, this new medium capability could be decisive on its own thanks to its new possibilities for crisis resolution. Last, let us note that digitalization, and in particular FRES units' one, should (quantitatively and qualitatively) increase the effects applied to battle space, by setting up a network with the various systems. Thus, before all, we await an effect **multiplier**[4] from digitalization.

Thus, the 2010 *British Army* will be a more coherent force, with rather more commitment assumptions.
Consequently, it is appropriate to wonder about the great principles that will guide its action.

WHICH ACTION ?

As seen before, the land component's action should lead to **tactical success**. However, it is important to clarify the concept of success as it is tackled by the British doctrine. Indeed, the style and the principles for land operations result from this definition.

What is success ? How is it measured ? Stepping back from quantitative answers (victory is achieved when the

enemy has some level of losses) or achievement ones (victory is obtained when the assigned objectives are achieved), the British suggest **to let the adversary decide**. In other words, victory is reached when the adversary is convinced to be defeated, the perception of his failure resulting into his collapse in real terms (quantitative and purpose).

Therefore, we shall strike its spirit and its will.
Thanks to historical analysis' means, a study carried out in 1995 showed that the four key factors of success are :
• Air space Management.
• Surprise.
• Shock.
• Aggressive scouting.

Therefore, any offensive action is doomed to fail if missing these elements and success is guaranteed with the combination of at least three of these factors. Chief point, **the force ratio has very few influence on** these conclusions.

If the " *Air space Management* " and " *surprise* " factors may seem familiar - even obvious - to the French reader, it is advisable to consider the " *shock* " and " *aggressive scouting* " concepts.
" *Shock* " can be defined as a **sudden violence concentration**. Its effects are to terror-stricken, deter, and frighten. " *Aggressive scouting* " is halfway between the French notions of " reconnaissance in force " and " *flexible attack* ". First of all, it is based on consistent intelligence assets, permitting to locate intervals and weaknesses in the enemy disposition. Then, it is a matter of maneuvering in order to exploit any opportunity, thus contributing to shock and surprise.

Obviously, these four factors refer to distinct categories and levels. It is possible to reorganize these results

as follows : in an **environment** where air space is controlled by friendly forces, shock and surprise **brought in** by aggressive scouting are conditions for success.

The crossing by German armored units at Sedan and their rush towards the sea in June 40, the Sharon division's raid in the Sinai in June 1967 and the seizing of Harriet Mount by the 42nd *Royal Navy* Commando in June 1982 are often mentioned to illustrate the tactically advantageous combination of these factors. But the corollary of looking for shock and surprise lies in the risk's increase for the attacker. Let us remember the warning of Von Kluge to Guderian whereas this last one was about to cross the Dniepr river : " *your operations always hang by a thread* ". How the British doctrine integrate these conclusions ? Which coherence between doctrine and future sets of forces ?

For many years, the British doctrine, and its implementation by the forces, have lived on a tension that they better managed to dissimulate than to solve. Indeed, on the one hand the *Manœuvrist Approach* concept (close to our Indirect Approach) had to crystallize the style of combat carried out by the *British Army*, on the other hand the " destruction " (a term less condemned than attrition, but nevertheless very close) of enemy forces remained the military goal of an operation as it was the case at the time of Montgomery and of the " conduct battle ". The whole *British Army* still structured, organized, trained and equipped for " destruction " had to think *Manoeuvrist*, i.e. attacking first the enemy's will and cohesion.

The introduction of the " shock " concept should establish the conditions for going beyond this tension and at last reconciling the future armed forces' models with their doctrines. **Thus, the 2010 *balanced force* and the doctrine governing its action will constitute a coherent set.** Indeed, if we remember that, for the British, the success of an operation is judged above all in the adversary's mind, it is necessary to put this last one into a state of mind where he thinks or believes that the opponent superiority is achieved and gives up the fight[5]. **The best way** to achieve this goal while saving forces is definitely to **surprise it** and to **shock**[6] **it**.

With this perception of military success, the *Manoeuvrist Approach* concept already tried to give a coherent answer. But it was just a style given to the maneuver and not its final aim.

When analyzing them, it appears that the capabilities granted by the 2010 *British Army* will be primarily related to the surprise and shock notions. In particular, the purpose of FRES units will be either to strike quickly and strongly in the early stages of a crisis, or to disrupt the enemy disposition's coherence by conducting aggressive scouting generally to the benefit of armored units. **In both cases, shock and surprise will be at the heart of the selected COAs.**

1 Without forgetting the airmobile capability. It was presented in an Objective Doctrine's article : Towards ˝2015 Air Maneuver˝ LTC Constant, Objective Doctrine Nr 32, pages 48 to 53.
2 From the common FRES platform, a complete range of assets should be developed : mounted warfare, dismounted warfare, scouting, C2 (Command and Control), medical, …
3 28 light infantry battalions.
4 The British summarize this approach through the Network Enabled Capability (NEC) concept, distinct from the much more global and ambitious US Network Centric Warfare one. For the British, digitalization remains a tool. The primacy of combat capabilities is asserted.
5 Panics, escape, rout, weak motivation for action, massive capitulation, irrational reactions to aggressions, …
6 With the medical meaning of ˝shock effect˝, as a ˝shock˝ consequence, a violence concentration.
7 This issue is particularly well described by R.May in its study of the 1940 campaign : Strange Victory, issued in 2001.

As a conclusion, we shall gather the various conclusions of our approach, to propose a draft for the 2010 British Army :

It will be a reactive and agile force, favoring high intensity training. It will rely on additional capabilities forming a balanced organization, with more open operating assumptions. Its future action will be centered on the shock and surprise notions, determining factors for tactical success. Then, we will have a strong coherence between the tool, its goal and its employment.

Let us notice that history shows that the armed forces, which mostly rely on the shock and surprise concepts (at operative or tactical level) were forces with limited resources, which had to win the day as fast as possible. The 1940 German armed forces are the best example[7] for it. In the case of the future British armed forces, the limited resource is not so much the financial resource than the tolerance of public opinion. It is thus necessary to act early, quickly and effectively.

The British
battlefield digitization

The British prefer the term command and battlespace management to digitization. Digitization sounds very technical, because in the more restricted meaning digitization consists in replacing analog devices by numerical ones.
The digitization interest lies in its capability to improve the decision- making process (the commander's role : commander centric approach) in order to generate new operational capabilities. For this reason, the provision of new technological resources installed in an incremental way within the existing staffs contributes to the control capability, but is not the expected major effect.

It is a matter of :
- simultaneously managing better (*the staff*) and controlling (*the commander*) the battlespace,
- Using less resources to obtain more efficiency,
- reducing the size of the units signature,
- going faster,
- striking harder and disengaging more easily.

BY LIEUTENANT-COLONEL **MANDILLE**, FRENCH LIAISON OFFICER TO THE BRITISH SIGNAL COMMAND

The British fundamentals

Command and control is the exercise of command which includes the level of command ability (*leadership*) and the decision-making training level (*decision making*). It is made possible by the control capability which rests on the command and battlespace management, i.e. digitization.
All is based on the command support capabilities (*communication and Information systems and headquarters support*).
The stress put on decision-making has direct implications on the main directions of effort. These directions are : training the division and brigades commanders to battlespace digitized command, and the brigade and divisions staffs within the British " *battlelabs* ".

The digitization stages

Digitization Stage (DS) 1, 2 et 3 represent different capability levels. They constitute the stages of the objective " *UK armed forces 2015* " and they are comparable to the French digitization chronology.

DS1
DS1 lasted longer than foreseen, chiefly because of the delays in the BOWMAN program. The objective of this first stage, that should end by early 2004 includes the analysis of the lessons learned by staff users (G1 to G4) as well as the partial improvement of the Ptarmigan radio equipment (equivalent to RITA 1G) and the one of the *Clansman* (equivalent to the 13 series), plus the fielding of the *AtacCs* new versions (equivalent to the SICF 1G successive versions) named *GP3*.

DS2
DS2 in 2004 will be characterized by the fielding of *BOWMAN*. This system provides the entire communication infrastructure as well as tactical information system terminals from division to battlegroup level.

It includes PR4G, CARTHAGE F5 and F6 equivalents, but without any direct French equivalent. It will equip, in an integrated way, all the CP vehicles with voice/data means along with operational information systems terminals for the Division, brigade and Battlegroup's CPS. In addition BOWMAN ensures the data flow continuity between the brigade and the Battlegroup thanks to the fielding of a high data rate radio network called HCDR (300 sets per brigade).

The operational information system itself will appear as early as 2004 through the fielding of applications common to all staff functions.

These applications that are based on BOWMAN (from the division to the Battlegroup) correspond very approximately to the employment of SICF and SIR, but these ones having their own hardware. These applications are known as " *ComBAT* ". *ComBAT* will be fielded to meet the G1 to G4, G6 and air defense

British decision - making process (*command*/the commander)

1 ANALYSIS (COMMANDER'S PHASE)

2 OBJECTIVES

OPTIONS

INFORMATION ABOUT POTENTIAL OPTIONS

OPTIONS

CRITERIA APPLICABLE FOR CHOOSING AN OPTION

Improvements in terms of capabilities directly linked to digitization

3/ COA EVALUATION

Interaction Commande & Control

4 choices

objectives

Action Analysis

Activities Evaluation

comparison

Control Cycle (COS with his staff)

requirements and to be used as a fire control and management system. As far as capabilities are concerned, the DS2 objective will be reached when, by 2006, the UK will be able to deploy a force including at least a brigade plus division and Corps troops.

DS3

The 3rd stage, post-2006 deals essentially with the way data will be exploited. The *Command Post 21* concept responds to this new approach that aims at setting a command team collaborative work around future pieces of equipment, symbolized by the E- bird table or by the Swede project ROLF. Beyond that concept, DS3 's intention is to have the entire Army adopting digitization in such a way that " *command and battlespace management* " becomes its normal way of functioning.

Digital capabilities

Digital capabilities are currently described in terms of " *capability epochs* ". As an example DS1 will have constituted a preliminary capability epoch. As a matter of fact, it made it possible to acquire very modest resources (*AtacCs/GP3, improved Ptarmigan*), but above all to adapt structures (adoption of the digitization by brigades and divisions commanders) and procedures (evolution of the working methods around the **chiefs of staffs,** major actors of the digitization success).

The DS1 phase's characteristic is to have been able to associate the totality of the major operational functions, in order to avoid the pitfall of a digitization presented and therefore imposed by CIS specialists to an operational combined arms community having not enough time available to express fully justified requirements. Until the end of the year 2000, the digitization concept had been the business of London authorities placed under the CGS' direction (Army COS), under the ACGS' control and the Directorate of Land Digitization's coordination. The main development that took place during that period has been the " *Army*
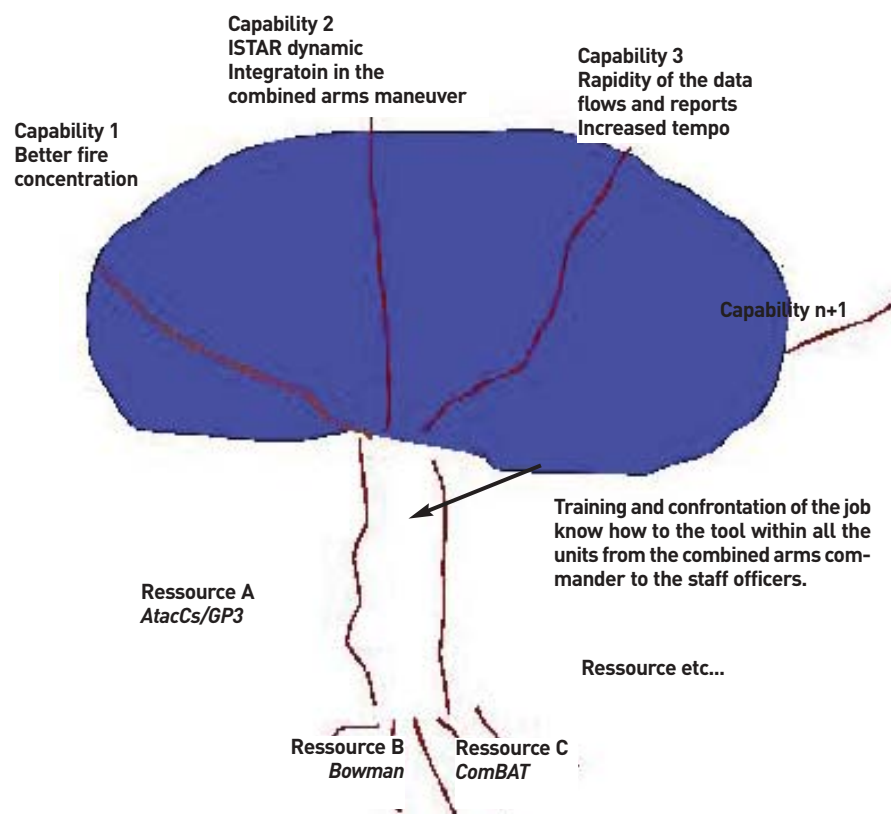
digitization management plan " which is updated every year. DLD defines digitization as : " the battlefield digitization consists in the exploitation of contingency information offered by numerical technologies in order to improve the operational capability " In the year 2000, the creation of the virtual organization Command Development Centers that includes the C2DC (the command and control) of Warminster and the CSDC (CIS) of Blandford made it possible to balance the CIS " *operational/production* " requirements. Thanks to the C2DC (15 officers belonging to support, combat support and combat operational functions) the British have at their disposal an organization able to clearly express to the CSDC which needs (and not of course, their type) they want to be developed in the area of Information and Communication systems in order to meet the DGD&D capability objectives and doctrine.

The MAPEX type exercises called *Brilliant Thunder* produce the matter necessary to establish these needs' requirement. But to lay down an objective does not produce a capability. Training and evaluations constitutes the battlelabs' job. The

recurring term of capability omnipresent in the " system of forces " jargon is described in symmetry to the word resource. The British sometimes use in this field the metaphor of " the tree ", explaining that the essential transition transforming a resource (*roots*) into capabilities (*branches*) is the training time which consists in confronting ones field of expertise with the new tool mastering (*the trunk*).

The image of the tree apart from its poetic nature shows clearly that the fielding of a Communication and Information System does not constitute in itself a capability, because the digitization goal, in accordance with the above mentioned definition, is representing the improvement of the Army's operational capabilities. The Warminster C2DC's capital role is to have, starting from its joint approach, **precisely** defined the capabilities sought after, in order to get the SIC resources as adequate as possible.

As an example the choice of a single communication and information architecture between the Division, Brigade and battlegroup levels is the direct answer to the requirements

Capability 2
ISTAR dynamic
Integratoin in the
combined arms maneuver

Capability 3
Rapidity of the data
flows and reports
Increased tempo

Capability 1
Better fire
concentration

Capability n+1

Training and confrontation of the job
know how to the tool within all the
units from the combined arms com-
mander to the staff officers.

Ressource A
AtacCs/GP3

Ressource etc...

Ressource B
Bowman

Ressource C
ComBAT

expressed by this organization composed of combined arms officers. This approach makes it possible to bring some relativity to the fielding slowness of the digitization resources, because during the phase DS1, the British have above all sought to get ready for the BOWMAN's fielding, thus benefiting from the program direction delays and from the financial, industrial as well as political vicissitudes. BOWMAN is the main pillar of the Army digitization (*one part of the program is Joint*), its fielding should mark DS2's starting point.

Digitization and interoperability

The British coordinating organization for interoperability is the *Directorate of Information* (*Army*) whose acronym is D Info (A), created on January 30, 2002 and installed at Blandford in 2003.
He is the successor of the DCIS (*Army*), but it is specifically in charge of ensuring the coherence of the British CIS in order to optimize the Army's operational capability within a joint framework. D Info (A) is from now on the single entry point towards the various interlocutors about the British CIS interoperability and the digitization rendezvous.
Its priorities are as follows :
- Requirement for the ministry of

defense to intervene more explicitly into the *Army Digitization Management Plan*.

- An effective adaptation of the Army operational architecture in order to have it included within the Alliance or coalition concepts of operational architecture

- The **MIP**, Multinational Interoperability Program becomes the main effort.

- A chronological, selective planning together with a realistic funding is essential to any participation of the United Kingdom in exercises and other performances with, in order of priorities : the United States, NATO, the ABCA and other organizations.

- The British liaison officers' tasks should be refocused in order to respond to the British Army digitization priorities.

- The training systems must be developed in coordination with the operational information systems and be interoperable with the Allies' and Coalition partners.

Driving the Communication and Information systems' interoperability

In order to meet these objectives D

Info (A) has identified 4 actors dealing with the three different domains of interoperability identified as :
- **Conceptual**, doctrines, comprehension of information.
- **Virtual**, i.e. on the one hand the applications/presentation of information to the users, and on the other hand the data, their storage and the transfer of information between the systems.
- **Physical**, CIS hardware.

These 4 actors are :
1. *DGD&D* (Upavon) : the organization defining the British Army concepts and the doctrine general architecture.
2. C2DC (*Land Warfare center in Warminster*) : the body defining and validating the procedures.
3. *CSDC* (SO*in*C HQ at Blandford) : the organization controlling the technical validations.
4. *Interoperability Branch* (Coherence ensured by **D Info (A)** at Blandford) : all the services dealing with CIS interoperability on the edge between virtual and physical (MIP is the main example of it).

These 4 actors are thus under the D Info (A) coordination.
The conceptual representation of the British CIS interoperability actors is as follows :

Physical Interoperability (bridege, protocol, layer...)
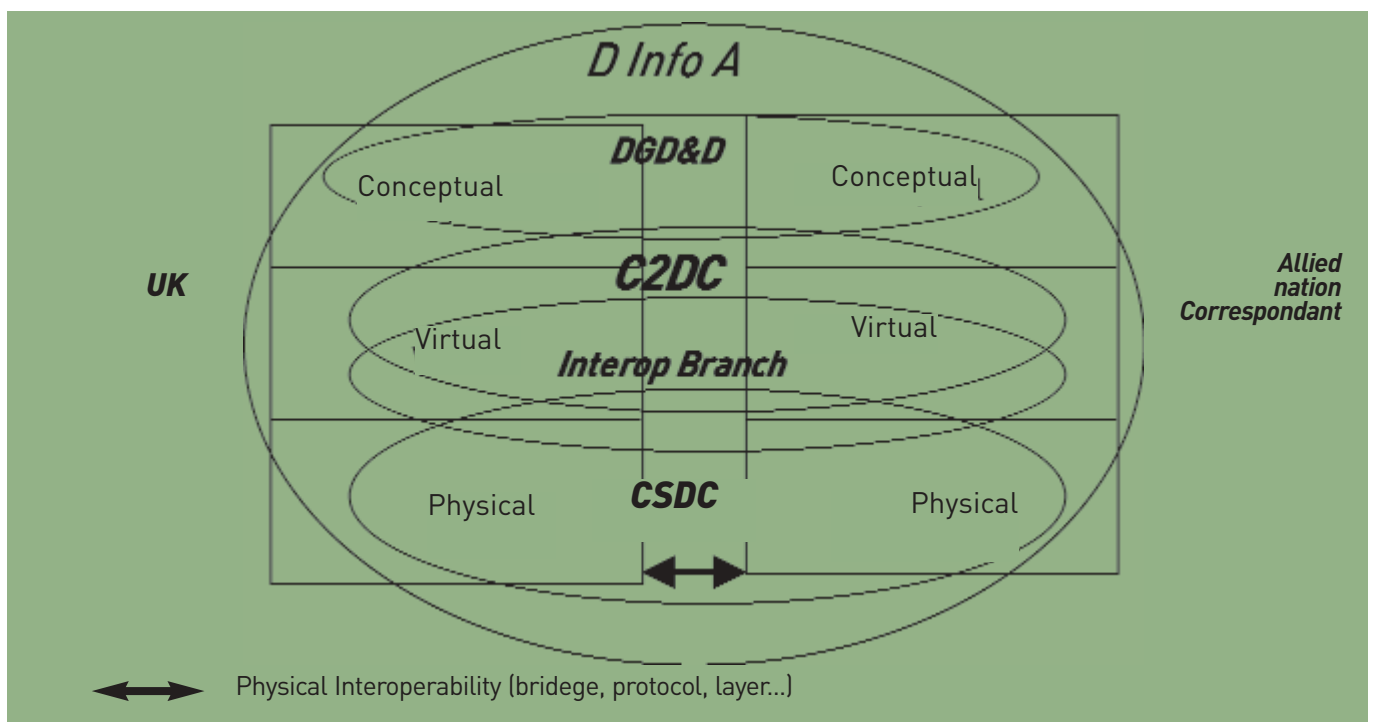
	2003	2004	2005	2006
MIP	■	■	■	■
Combined Endeavour		■		■
ABCA		■		■
MDIE		■		■
JWID	■	■	■	■
Cathode Emission	■	■	■	■

The convergence of the interoperability exercises

The creation of D Info (A) with its multinational interoperability coordination role allows to have a global vision in order to regroup the various exercises linked to this domain.

The interoperability exercise *Multinational Digitization Interoperability Exercise* (UK, FR, US, GE) will make possible for each nation to implement the digitized brigade command posts.

1. Operational level J*oint Task Force Headquarters*

The CORMORANT communication system (manufactured by Cogent, an EADS company) constitutes the area network connecting simultaneously the Air and Maritime components HQs (as well as joint logistics and special forces) to the local area networks of these HQ components. As far as employment is concerned, it is equivalent to the future French system ARISTOTE, it replaces as of the second half of 2003, the EUROMUX system.

Air transportable and shaped in packages, it consists of " *off the shelf* " technology and meets the interoperability requirements of a joint communication system. It equips the 30th and 2nd Signal Regiments The operational information system " *Joint operations Command System* " is the current command and control system at joint level.

2. The Corps/ARRC/Division/Brigade level area network

The Falcon system (equivalent to RITA 2000) will start modestly to replace Ptarmigan in 2006 within the 1st Signal brigade, it will then equip the divisions by 2008 (the contractor is not yet officially identified). It will constitute ;
- Simultaneously the area network linking the ARRC CPs to the divisions' as well as to the ARRC CPs local area networks,
- the area network between the divisions (UK) and brigades (UK) CPs and the BOWMAN local area networks,
- a capability of servicing the " non UK "subordinate divisions CPs subscribers,
- a connection with the air component Connections with the maritime component and the automatic radio integration coverage are still not approved financially speaking.

The ARRC's operational information system is the AtacCs' last version called GP3 (equivalent to SICF1G in its most recent versions).

3. Divisions, brigades and battlegroups local area networks

The BOWMAN long awaited communication system is key to the British digitization. It will allow the replacement of all the HF and VHF radio stations down to the squad/gun/tank level.

The high data rate radio network HCDR allows an effective data rate of 300 kb/s to ensure the **data** transmission continuity (no VHF voice connection) between the brigade (level 3) and battle group (level 4) (equivalent to the future French GRAC 4 in terms of requirements but not of employment). Although it is a system of systems predominantly oriented towards communication, *BOWMAN* includes information systems data terminals from the division to the platoon level ; on these terminals will work the combined arms applications named **COM**mon **BAT**tlefield tool as well as the specialized ones for each of the operational functions called **B**attlefield **I**nformation **S**ystems **A**pplications.

4. The SKYNET 5 telecommunication satellite

SKYNET 5 will replace SKYNET 4 and will have a band-width permanently allotted to the MOD with an on-request possibility of extension.

Battlefield Information Infrastructure
by 2006

Red : Communication systems
Blue : Operational information systems
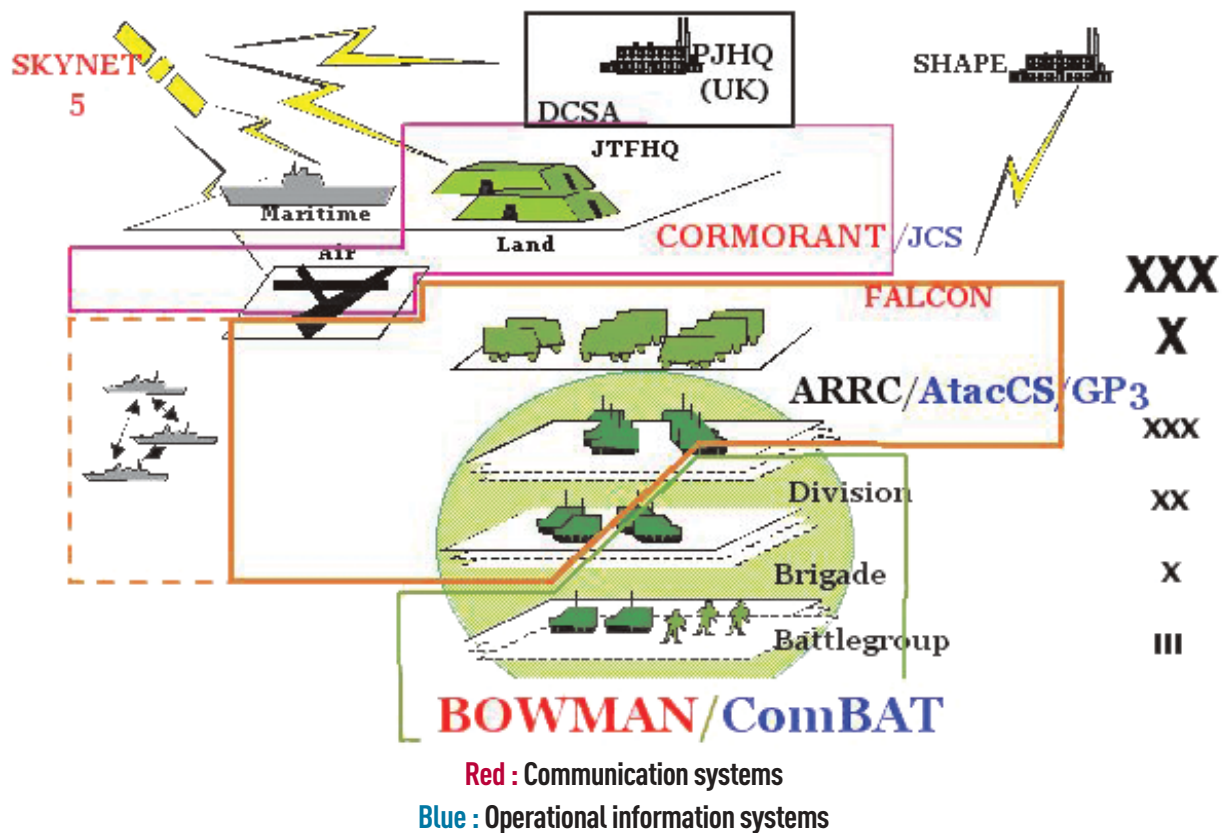
Conclusion

The British faithful to their practice of separating command from control define digitization as being the battlespace command and management, its interest residing in its capability to improve the decision-making process. Fully aware that a resource is not in itself a capability, they chose an organization able to provide them with a statement of requirements about information and command systems types that should generate a competitive advantage.

This statement of requirements is materialized by a very strong homogeneity of the future architecture for battlespace digitization at division, brigade and battlegroup levels thanks to BOWMAN/ComBAT.

The interoperability digitized multinational exercises in 2004 and 2006, constitute for the British a significant rendezvous with the aim to maintain their level of interoperability with the United States and by default with other nations.

The German
land forces future CIS

Information is a parameter which holds an increasingly significant role in the command and control process. Be it during the everyday garrison life or during operations, it is necessary to guarantee a flow of elaborate and relevant data, in order to meet the *Army* modern requirements. The chain " command and control - intelligence - fire support - combat service support " must be able to exchange information with our allies. The *Army* IT system (*information technology*) constitutes the material platform of this chain. It will be included in the future joint IT system, it rests on three pillars : data processing means, transfer of information means and command posts equipment means.

By lieutenant-colonel **BILLY**, Army liaison officer to Heeresamt Cologne (Germany)[1]

First pillar : the data processing means

The essential element of the data processing means is the Army command and information system (CIS), that links all of the hierarchical levels. Being a specific component of the future joint CIS, it will be developed as an assistance to the land forces C2. For combat operations, it will be integrated within mobile platforms such as Command posts and fighting vehicles linked together through tactical communication systems. It is envisaged to equip the command posts with the *Army* SIC (SIC/AT) starting from the divisional level and down until the lowest level.

This new approach includes mainly the following steps :

• In partnership with the communication system, the program aims at making, earlier than envisaged initially, an assistance to digitized C2 at all the hierarchical levels.

• The first batch of the *Army* CIS must integrate the results obtained during the development of the following programs: HERO 2/1 (2nd stage), *Army* regimental information system and the command and branch system, in its basic version[2]. The required objective is to develop a system that could be used at all the hierarchical levels, in order to meet as soon as possible the urgent requirements of the operational units.

• From the second stage onward, the 9.4.4 pilot program data (Army component of the Joint CIS) will be reviewed and used, according to the financial means granted for the SIC/AT software development.

• The fielding will be carried out major unit per major unit by equipping all the hierarchical levels almost simultaneously.

During the transitional phase and until the achievement of the new approach, the SIC/AT will be used as a model for all the programs which will be embedded within this new approach, namely HERO -2/1 (*second batch*), command and branch system (*basic version*) and command and branch system for combat units (IFIS)[3].

Since SIC/AT will be a specific component of the envisaged joint CIS, it will be necessary to develop the command and branch systems as well as the command and implementation systems as being a specific component of this SIC/AT. This one will thus be used as a model for all command and branch systems and command and implementation systems as well as the associated programs (*assistance to data processing within the military intelligence cell, multinational interoperability programme for the CIS of other Armies*) that are currently at the preparation stage. They are developed in accordance with the provisions of the CPM (*Customer Product Management*) 2001 and are technically adapted to the SIC/AT new approach and to the functionalities offered by it.

With regard to the field artillery (*Adler*) and air defense systems (*HflaAFüSys*) already implemented, it is appropriate to start similar measures in order to ensure their interoperability with SIC/AT. In a medium term, they will have to be also adapted to the new SIC/AT approach.

According to current planning, the SIC/AT development started in 2003. The acquisition that should be spread over 6 steps, is envisaged to begin in 2005. The last division equipment will be carried out between 2018 and 2020.
Admittedly, the Hero-2/1 program, second stage, will be replaced by the SIC/AT new version, but it will be kept in active duty to equip the multinational Corps HQs within which the German participate (*Eurocorps and the 1st German-Dutch Corps*) until they have completed their multinational commitments.

In addition to their integration envisaged in the first batch of SIC/AT, the results obtained during the development of the FAUST[4] programs are also taken into account during overseas engagements. Within the procurement of C2 assistance means to the benefit of the ISAF (International Security and Assistance Force) and of the TFH (Task Force Harvest), the *Army* bought "laptops computers" hardened for CPs, ATF, Dingo, and Wolf vehicles as well as for Fuchs IFV. The FAUST E1 software (modified version) is used by KFOR, SFOR and ISAF since the beginning of the year 2003.

Second pillar : the transfer of information means

The chain "command and control - intelligence - fire support - combat service support", intended to ensure and improve the *Army* C2 capability depends on powerful and adaptable connections according to the needs. The evolution of the information technology and the increased requirements for integration of audio, image and video data require communication systems increasingly faster and powerful, whose

mandatory capabilities shift everyday more and more from vocal communications to data transmission one.

The *Army* mobile tactical communication system is being confronted to these challenges at the Wide Area Network (WAN) level as well as at the Command Posts (*Local Area Networks : LAN*) and the radio network levels.

Wide Area Network (WAN)

AUTOKO 90, the German *Army* WAN, mobile, digitized and automated makes it possible to set up, starting from the corps and down until the brigade level, easily configurable radio networks, it also provides the possibility to exploit them over the entire area thanks to connection nodes.

The AUTOKO 90 fielding has been completed, as scheduled by the end of the year 2002. This constitutes a significant step towards the *Army* digitization. Regarding the AUTOKO 90 evolution and modernization, an improvement of the data transmission capabilities is envisaged.
The following generation hertzian technique aims at achieving data rates of transfer permitting to meet, at least partially, the requirement to hold video conferences through the mobile WAN.

Almost independent of range and location, the satellite communication systems are providing flexible connections with high data rates of transfer. It is highly probable that the *Army* will not have, before the year 2008, any permanent available satellite communication system. In the short and medium term, the *Army* will have thus to call upon the existing commercial systems (INMARSAT) as well as the Allies' satellite ones.

For SFOR and KFOR engagements, beside single track satellite systems, the *Army* is currently using wide band multi-channel systems.
The communication capability using
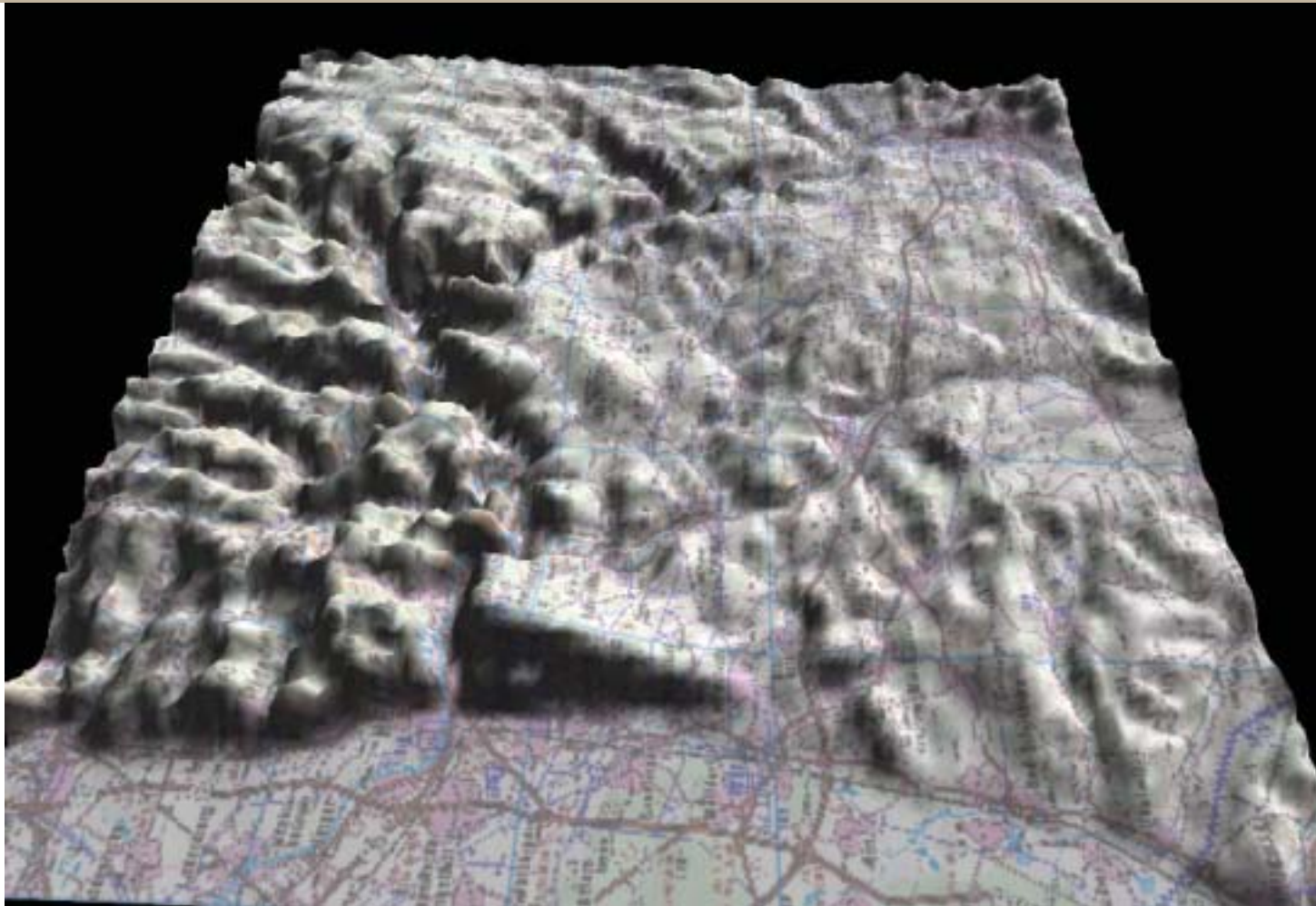
HEROS program.

rented assets, as well as the ground stations that are also partially rented, are however subjected to some limitations of employment. Only the future satellite communication system will be able to meet all the required military characteristics such as the guaranteed availability of communication capabilities, security requirements regarding information technology (*including resistance to jamming*) and interoperability. It will be the same for the characteristics related to protection and mobility.

Command Post Network (Local Are Network : LAN)

The corps, divisions and brigades command posts, (*insofar as the brigades do not belong to a specific branch*) will receive, as a mobile LAN, the CP's wide band integrated communication network BIGSTAF. The BIGSTAF optical fiber part is connecting the various cells and centers⁵ of a partial CP.

It provides for data-processing and vocal communication and replaces the " *wiring* " that previously connected the various subscribers. The data transfer rate, currently reaches 10 Mbit/s. The acquisition process for the first section of the " *optical fiber* " part is almost completed. The acquisition of the second part was authorized in July 2002 and will begin in 2003. The capacity of the system as far as data-processing and vocal links are concerned, initially required for various CPs, has, meanwhile, been appreciably improved. The initiative related to a Backbone wide-band network, likely to increase the data transfer capability from 10 up to 155 Mbit/s, was adopted. The acquisition of the third part is planned for 2006 and the following years.

The BIGSTAF Radio network section takes up primarily two functions, to replace the optical fiber part and especially to connect the subscribers. the Radio network section establishes

the communications within and amongst the partial CPs.
At the end of the BIGSTAF radio network experimentation in the field units, its operational capability has been pronounced. Moreover, a brief study has been undertaken to examine whether the BIGSTAF radio network section could be replaced by commercial assets such as LAN radio network. A comparative analysis, currently carried out, considers a modified version of the BIGSTAF radio network section. The decision about its acquisition will depend on the results of this analysis.

The battalions and companies CPs are currently equipped with LANs generally made up with manual commutations and traditional wiring connections (splices type).
Within the digitization framework, starting in the year 2005, it is envisaged to introduce at all *Army* levels, a digitized commutation network of the Standard ISDN type. Within these CPs, the data treatment

and transmission requires, in particular after the introduction of the SASPF[6], the provision of LAN suitable for the CPs, the acquisition of which is envisaged within the SIC/AT framework.

The radio networks

The radio electric frequency (HF) is an essential mean of communication, when the point is to establish, in an autonomous, fast and reliable way, connections at medium and long ranges, to superpose fixed or mobile communication networks, or to replace them for a given date.
The HF teleprinters teams currently available within the *Army* are not yet all suited for data transmission.
The next stage in the HF component evolution will thus consist in providing them, in the medium term, with data transmission capability.

The VHF (SEM 70/80/90) radio assets family is the keystone of the mobile radio constituent within the *Army* communication system. It is fielded within the entire department of telecommunication and liaison, but is not able yet to transmit data without complementary means. SEM 93 is currently the most modern piece of equipment used within the combat radio network. In addition to the capabilities of a VHF equipment, it integrates data transmission, encryption and frequencies saving modules. The acquisition of the third batch began in 2002, but was limited to 700 pieces of equipment.

The combat radio network evolution is referred to as " *multi-band, multipurpose radio* ". Along this approach, various radio means are

regrouped on the same platform. A software controlled radio asset can use, for vocal and data processing communications, three frequency bands (HF, VHF, UHF). The radio means can be connected to the infrastructure network and the problems posed by the combat radio network interoperability will then be solved by means of downloadable forms of waves.

Data-processing communication within an autarkical military environment constitutes a specific challenge. The data-processing communication being much wider than the data transmission (*several sub-networks*), a communications server was developed and tested during a field experimentation. When developed, this server will become an independent project which will take into account the characteristics relating to the radio data transmission adapter.
Within the framework of the *Army* " *air-mechanization* ", it is envisaged to acquire the real time data transmission system MIDS/Link 16 in order to be able to integrate *Army* aviation, field and air defense artillery to airspace management at national and international levels.

Third pillar : CPs' equipment

Although the above described means constitute " *the tools* " enabling the commander and his staff to achieve their missions, the CPs teams committed in operations, are like workshops, where all the CP's cells/centers equipment are integrated. A mobile CP is not able to function without a CP's technical team.

It is envisaged to put at the major units' disposal new CP teams equipped with modern and complementary equipment. According to the hierarchical level and to the mission of the unit to be equipped, the plan includes several types of teams characterized by their size, protection and mobility. As far as divisions and maneuver brigades are concerned, the SIC/AT program currently regroups nine different types of teams, in order to allow a coordinated equipment for each type of major unit. It is planned to equip also regiments and battalions with these vehicles in order to achieve an Army-wide standardization. It is the same for the command vehicles (light vehicles). In this case too, a total equipment with standardized vehicles is envisaged at all hierarchical levels. Corresponding programs have been initiated.

[1] From an article ″Digitalisierung der Einsatzkräfte ″ in Wehrtechnischer Report 1/2003 May 2003.
[2] The basic version integrates all the essential functionalities and is supplemented on a case by case basis by the specific functions of the various branches.
[3] Equivalent to the French SIR.
[4] Acronym that regroups the Regimental information system and Command and branches systems/ Army basic version.
[5] Cell : Command Post.
Centre : forward CP at Corps level.
[6] Standardized software products.

The Army IT system constitutes the material platform of the "command and control - intelligence - fire support - combat service support " chain. It includes data processing means, transfer of information means and means intended to equip the command posts. In all domains, equipment gaps exist. In order to bridge them, many programs have been initiated or are under development or being acquired. In particular the " SIC/AT " development constitutes a significant step towards Army digitization, since this program does not envisage only data processing means, but also the equipment of the Army divisions and maneuver brigades CPs. The planned acquisition of modern communication means will make it possible to get closer to a digitized communication network at all the hierarchical levels. This global approach is materialized through a fielding process carried out for each major unit as a whole.

Digitization
in the Spanish army

D OCEX, the seminar about doctrine annualy organized by the CDES/CREDAT and the MADOC doctrine direction had for subject in 2002 the battle space digitization and more precisely the engagement of the digitized brigade around the year 2006.
Like the other main European countries, the Spanish army is conducting studies about the digitization of the information systems, starting from the central staffs down to the brigade units. The initial studies are starting from the American definition of digitization written in the document Joint Vision 2010 " ...the information technologies must help to have a clear and accurate picture of the area of interest and to facilitate the planning and conduct of operations ..." The "*intellectual*" realization of digitization, a technological evolution of the information systems, to help commanders and not as an end in itself, is presently completed. It remains to make more interoperable the different information systems fielded (or to be fielded) in the army, which represents an important technological challenge, but quite achievable in the years to come.

BY LIEUTENANT-COLONEL **MINJOULAT-REY,** LIAISON OFFICER TO **MADOC**

The doctrinal process which took place around the theme of battle space digitization will not be mentioned in this article since it is based on established facts shared by all modern armies ; on the other hand, some aspects dealing with its implementation in the units will be developed. But mainly will be presented the different systems, coming from the national industry, that are the digitization medium in the Spanish army : these ones are already fielded or in the process to be fielded, or still in the development phase.

The project materialization

Digitization is above all one concept stemming from a technological revolution, aiming at facilitating the commander's job in the battlefield ; if all the levels of the command structure are concerned, it is nevertheless interesting to observe the

implementation of that concept in the brigades, the fighting tools intended to win the day.

In the absolute, all the brigades might be digitized, nevertheless the light brigades (*legion, airborne, airmobile, mountain*) the battalions of which are not motorized (*or only partly*) will not

benefit from a system as complete as the other heavier brigades. In all cases, the full digitization of one or several brigades in the mid- term seems to be out of the question. The traditional transmission means will keep co-existing with integrated systems within the same major units. As for the lowest implementation level of digitization, the Spanish army considers that it must be the level of the tactical taskforce (or battalion), being also aware that the Leopard tanks and the Pizarro FIV (but not the Centauro wheeled armored vehicle) are planned to be fitted with a SIMACET terminal. As for the small units (*from company to section*) they will not be digitized since, for the time being, it is first necessary to privilege the integration of all the existing or future information systems. Finally one can stress that the "*Future combatant*" program which is roughly developing at the same rhythm as its French equivalent rules out the extension of digitization to all combatants except for the sole platoon leader who will have a SIMACET terminal at hisdisposal.

Presently the Xth Mechanized Brigade in Cordoba , the best equipped mechanized unit, is beginning to be fully digitized down to the vehicle, for its battalions equipped with Leopard tanks and Pizarro FIV.

On the other hand, it is inevitable that the development of new information systems, and the modifications they entail on how to conduct actions, have some consequences on the units functioning and first on brigade CPs.

-The brigade CP will not necessarily be grouped as it is presently the case, some of its elements may be deployed outside of the operation zone. As regards command and control, the organization of the future digitized CP should enable the brigade commander to conduct the operation from any point of the battlefield.

-Digitization should contribute to lighten their manpower and to render them more mobile and reactive.
Of course, if going into details, the

intelligence cell should rather increase when taking into account the importance of the information flow that will be forwarded and requiring to be analysed, but on the other hand, the brigade logistic cell should become only a mere mailbox ; it must be noted that the subordinate unit CPs will be strengthened in order to be able to face the great amount of data requested by the system, at least until the new information systems will not be fully operational.

-Retaining an alternate CP seems almost necessary to make up for the main CP during the change of locations or to replace it if destroyed ; but the rear CP, which still exists in the Spanish brigades, should disappear due to the technical impossibility to digitize two CPs ; the logistics of the brigade presently managed within the rear CP will then be ensured by the main CP.
-Finaly, it is clearly stated that the technological systems set up within the framework of digitization must remain in the service of the commander who, as a last resort, makes the decisions and conducts the operations. But precisely, in emergency, will digitization permit to be rid of some hierarchic levels ? This technical possibility which would make possible, for example, to have a task force commander directly speaking to a tank commander is not looked for in Spain. As well, the option consisting in having recourse only to very specialized people to operate the systems, is a priori excluded.

The systems

The project represented by digitization in Spain relies mainly on the techniques used ; it is fundamentally supported by a central system, while having to integrate other functional systems.
The digitization core in the Spanish army is the Army Command and Control System (SIMACET), the

SIMACET terminal

development phase of which started in 1999. The third version has been successfully tested by the end of 2002. It is a global system which largely goes beyond the framework of the brigade ; it permits :

-to obtain a global picture of the battlefield for all the users, through terrain representation and thanks to tactical symbols.

-to help for planning, decision making and conduct, it facilitates the drafting of free or formatted messages.

-to ensure interoperability with the other army systems and with the nets of the other services (SIJE, SACOMAR, SIMCA, etc...) and of the allied countries (SICF, ISIS, HEROS).

As a unique information system to command the operations, it must therefore connect, at national level :

-the highest level i.e. the central staffs (*Defense staff and each of the staffs of the three services*)

-the intermediate level represented by the major units operational staffs. In this respect the operational evaluation of the rapid reaction NATO CP, established at Valence, in November 2002, confirmed the efficiency of the SIMACET system which connected the HQ CP, the two CPs of the Corps under trial, two division CPs, six brigade and several battalion CPs.

-the lower level ranging from the battalion to the fighting vehicle.

The connections must also be realized with the projected forces and the networks from other countries.
The most important components of SIMACET are its data base and its mailing system.

The data base uses data structured according to the ATCCIS standard in order to permit interoperability with other systems existing in NATO : it is the MDC2ET base. In the same way ,an identical picture of the battlefield will be provided to all the users from a cartographic base (GIS) which will reach the NATO interoperability level 5 (on a scale from 1 to 6).

The mailing system uses the NATO standards ; it permits to send and to receive secured messages while offering the possibility to have a personal Lotus (non secured) mailing system.

Within a brigade, the SIMACET nodal centre is composed of two servers fitted in a shelter ; the users can be connected to the local net with portable computers. In the battalions, two portable computers connected to the SIMACET system constitute the link; the battalions and the brigades are linked together thanks to the Area basic net (RBA).

The RBA is the tactical telecommunication medium of the SIMACET ; very similar to the RITA system ; it relies on a meshing of nodal centres covering the operation zone of the deployed major unit ; it permits the integration with the *Combat Radio Net* (RRC), the main radio set of which is the PR4G, and with the armed forces infrastructure communication net (RCT) ; finally, it is totally interoperable with the NATO net and the RITA system.

The integrated system for the Army logistic management (SIGLE) aims at permitting an integrated management of the logistic activity, through its different functions.

OLI espagnol/CDES

The main present difficulty is in the RBA small data transmission flow which is not compatible with the importance of the flows accepted by the SIMACET ; however this deficiency is on the way to be solved. On the contrary, the problem is more difficult with the RCC, the equipment of the PR4G family being able to process data not exceeding 1.2 kilo bits.

The Spanish army also uses functional information systems ; some of them require a modernization or at least an adaptation to become compatible with the SIMACET. Others are under development.

-*The Ground Information System* (SIS), already old, collects data provided by the sensors aimed at collecting intelligence, these data are then given to an intelligence processing centre which analyses them and then introduces them in the SIMACET.

-*The integrated system for the army logistic management* (SIGLE) aims at permitting an integrated management of the logistic activity, through its different functions ; an important adjustment will be necessary for the system to be integrated into the SIMACET.

-*The Air defense artillery information system.*

-*The field artillery information system* (PGCACA).

-*The engineer information system* (INFOING) under development.

-*The electronic warfare information system* (GESTA) also under development.

-*The Leopard tank information system* (LINCE) which permits to each tank to communicate with the higher echelon in real time : transmission

and reception of orders during action, requests, awareness of the tactical situation, logistic data, etc... this system is from now on fully compatible with the SIMACET and constitutes therefore a SIT (for the Leopard tank). This system is beginning to also equip the Pizarro combat infantry vehicles.

Finally, the polluted zones reconnaissance vehicle (the VRAC-NBQ), an equipment currently under trial, is fitted with a terminal which is automatically integrated in the NBC domain of the SIMACET.
The major challenge for the whole of these very varied systems relies on their adaptation to the SIMACET system ; it has been decided that the systems should reach the interoperability level 6 (at national level, level 5 with the allied countries) before 2006.

Like in the other modern armed forces, the digitization process is considered in Spain as a major stake ; if the concept is now clearly defined and numerous soft wares effective, the employment procedures of the digitized forces are still to be studied, or a new planning method is still to be adopted (which is on the right track) ; In fact, the impact of the concept on the Army future evolution is considerable. Nevertheless, it is clearly stated that digitization remains a tool to help the operational commander, which must contribute to develop his freedom of action and to speed up decision taking.

In the Spanish army, digitization relies, technically, on the SIMACET, an interoperable system, the efficiency of which is recognized by the other countries. From now on, integrating the different functional information systems (intelligence, acquisition, support, logistics) within a single digitized system still remains to be done as well as to carry on the system development into the units.

From tactics
to operational

The most significant upheavals taking place in the field of technologies and that mainly result from an increasing calculation power and from space mastering, lead to review our concepts about tactics, that is to say : our combat practices, our task organization, the role of each combat asset, and our maneuver concepts. Beyond this domain, it is right to question whether maneuvering tactical formations deployed on a single theater is to be notably modified by this evolution and whether, in this matter, it would be necessary to envisage doing differently.

BY GENERAL (RET.) HUBIN

Task organizing, coordinating, and maneuvering tactical formations are matters of the so-called operational level. An hybrid level in between tactics (employment of branches to fight the enemy combat capabilities) and strategy (global use of forces to impose one's will onto the enemy) which limits with these two areas are so difficult to define that some prefer not considering it as relevant. We will keep this level in this article with a view of vocabulary simplification and to characterize that moment when the matter is not only to use forces to destroy or neutralize but rather the one dealing with the coordination of actions conducted by various tactical formations operating on a same theater in order to control it. Then, most often, we are moving out of the strict combined arms field to tackle the joint one at least in its air-land dimension.

In that matter, our present concepts are still hampered by the logistic support requirements related to armored army corps of the former Central Europe Theater and leave few room to operational imagination.
The matter is to demonstrate that this situation should evolve based on the idea that the link between tactical and operational areas is mainly taking place at logistic level and that the improvements of this one gained through the technical advances let think that the operational level will have and moreover will be able to act in a different way. As a matter of fact, maneuver spaces are not only to widen, but, above all, the operational level is to regain a real capability of logistical maneuvering.
The question about widening maneuver spaces will not be developed in this article that is only dealing with the regained capability of logistic maneuvering.
To make it clear, the relationship between those three domains (*operational, logistics, and tactics*) should be considered. The size and command level criteria do not look worth being considered any further because it has been noticed that huge forces be restricted to tactical matters (case of the WWI corps on the North-Eastern theater) when at the same time skeleton forces were dealing with operational issues (case of our continued presence in Morocco during the same time). Then it looks more interesting to consider the direction and range characteristics, in a way, the scale components of tactical, logistic, and operational actions considered as vectors

The first one, the tactical vector, is oriented along a direction of engagement the origin of which is located at the level of the tactical force it is characterizing, and the maximum range of which matches the size of the action area of that force. It is obvious then that the orientation of the tactical vector is roughly perpendicular to the front line of the layout and that it is aiming at the enemy command and control facilities and supply means.

The second one, the logistic vector, is the link between the tactical force and its operation[1] enabling center along a direction that we will name "*operation line*" and with a range directly depending on that of the tactical action it is supporting. It is blindly obvious how vulnerable is that line, all the more when its activity is of a continuous nature. Its breakdown very quickly leads to paralyze the corresponding tactical force. From there it is easy to see the advantage to get it covered by those tactical means and therefore to broadly bring it into the same alignment as the engagement direction this one being perpendicular to the "*frontage*" of the disposition so covering it at best.

The third one, the operational vector, has its origin at the starting point of the force, which usually coincides with its source of supply, it is using the same line as the general line of operations that runs up to the set objective. This general direction of operations is the line around which is organized the action of the various tactical elements.
It is clear that the sequence from tactics (direction of engagement) to operational (direction of operations) is achieved around the line of operations, that is to say around logistics. Up to now the trend is still not only to have the three directions aligned but also to have on that alignment the origin points of the various vectors mainly to ensure the continuity of the supply flow.
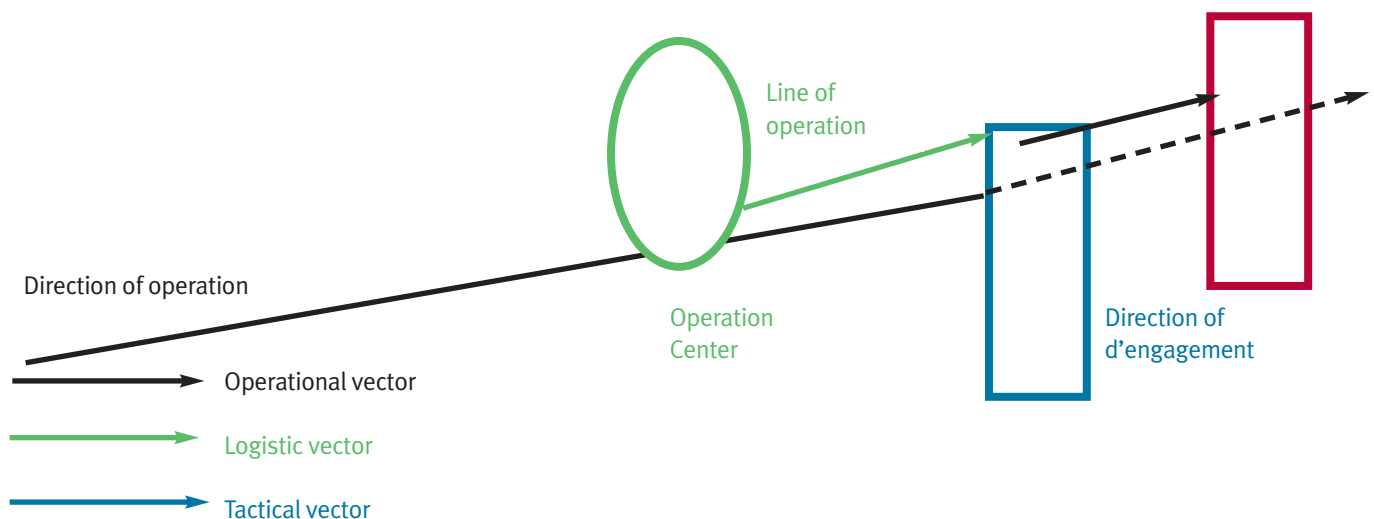
As long as it will not be possible to significantly vary the orientations and origins of the tactical and operational vectors, there will be no operational maneuver worthy of the name. We will stay in the domain of frontal actions where capabilities are strictly assessed from the accounting angle of force ratio and of volume of forces to support. In such conditions, the few prospects for maneuver could only come from gaps occurring in the dispositions. Therefore they can only be of a tactical nature, whereas only changing the angle and origin of the tactical vectors is likely to open the doors for an operational offensive maneuver. In addition it is obvious that the tactical and logistic vectors cannot be dissociated: the first one cannot last without the second one, and that latter has no justification without the first one. So any difference between the tactical and the operational vectors cannot be conceived without an equivalent difference of the logistic vector. It is blindly obvious that only a shift in the position of the operation enabling center aside the operational axis can make possible to shift the logistic vector and consequently the tactical vector apart from the direction of the operations.
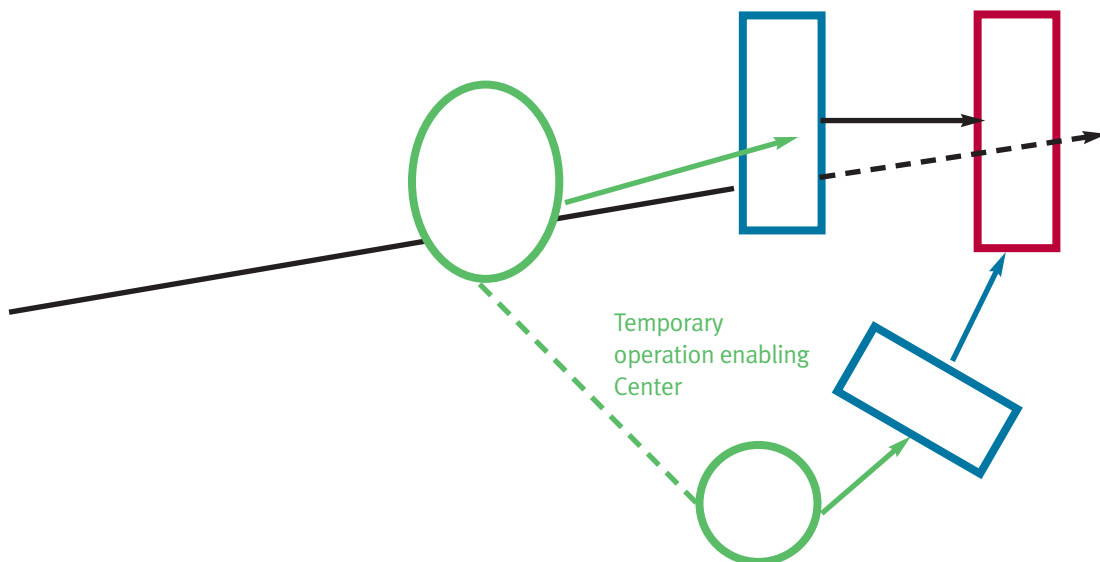**Let us sum up :** there will be no operational maneuver if there is no possibility of separating the axes of the tactical and of the operational vectors. Yet, the first one is indissolubly related to the logistic vector that gets its origin in the operation enabling center. It is then necessary to move that one to get the wanted shift opening the way to an operational maneuver. However there is no point considering this possibility if the logistic issue is set in terms of supply flow only, on the contrary if momentarily it can be set in terms of supply pulses then a break in the alignment could be considered.

The author 's feeling through these lines is that we are now reaching a new step when the technological progress is to change drastically the rules not only for tactics but also those of logistics so allowing, on one hand, to momentarily but significantly reduce the

Direction of operation

Line of operation

Operation Center

Direction of d'engagement

→ Operational vector

→ Logistic vector

→ Tactical vector

Temporary operation enabling Center

quantities to be transported, and on the other hand to shift from managing supply flows to managing supply pulses. These decisive changes should allow considering the establishment of temporary operation enabling centers and to momentarily dissociate the tactical and operational vectors.

Along this pattern, the requirement for covering the lines of operation with tactical means is met and it is the temporary gap between the logistic vector and the usual alignment that provides the tactical forces with a real maneuver capability. Is it possible ?

The logistician is assailed by three major difficulties : the volume of POL to provide, the tonnage to be routed, and medevac. Up to now, the required quantities, the anticipation capabilities' weaknesses, and the poor performances of the transportation means directly led to setting up norias, as the only one method up to satisfy the needs. The very idea of noria implies that of continuity and so does not fit well to the establishment of a temporary operation enabling center that allows some difference between the logistic and therefore tactical vectors.

As for POL, we cannot but to notice the continuous increase of the operating range of all types of vehicles. An operating range of 400 kilometers is a minimum, 600 kilometers are usual, and 800 are no more exceptional. In such conditions considering gaps of about one hundred kilometers is no more utopian.

As for loading capacities, up to now they were nearly fully absorbed by field artillery ammunition. It is not because other items were fully negligible, but their weight was not significant compared to that of artillery specific supply (D serial). Such a situation was not the result of human malice, but rather of methods they had to implement because of the poor performances of the available techniques.

In this specific case, as long as field artillery was to fire at area grids and not at the target itself it was bound to pour tons of ammunition next to what it could not hit. Now this situation is on the way of being radically changed because of the progress of ammunition and the direct hit is turning from the status of "wild hit" to the one of common practice. Of course, this performance will have a cost and it will be high, that is why the number of delivered rounds should be considerably reduced under the influence of both cost and accuracy. These new capabilities will entail various consequences the most significant of which will be to change the status of field artillery from fire support branch to decision one, but also to reduce significantly the supply loads to be transported by roughly 1/5, what should completely change the issue.

Moreover, this new effectiveness of field artillery associated to a significant improvement of the battlefield visibility will prevent to form up those concentrations that until now are essential to build up fair balance of forces. In addition, and everybody knows it, costs are affecting all types of equipments, so much that the density of the dispositions will dramatically decrease and consequently their supply weight too. In other words, the logistic autonomy of tactical forces should considerably improve and doing so should allow considering the temporary gap mentioned above.

The subject is more tricky when dealing with medevac. Admittedly, it appears that modern warfare should not let us face the risk of horrific massacres such as those that took place during the last two world wars but conversely the personnel of modern armed forces, used from their daily life to call the emergency medical

The improvement of the navigation systems, of the logistic means mobility, and of the maneuver space management, allow foreseeing a significant enhancing of meeting procedures.

Vincent BEGON/ECPAd

assistance service on the slightest alert, would hardly accept the idea of an interruption of the evacuation capabilities. What is more, the imperatives of effectiveness as those of humanity forbid planning for such a perspective.

The solution will come from the 3rd dimension only. Much hypocrisy is prevailing about that topic. Everybody pretends to believe that utility helicopters will participate to the tactical projection. Probably is it pure intellectual thinking. They will be fully used on the one hand for the army aviation logistics and on the other hand in medevac. From then on, and including this last domain of action, the matter will no more be considered in terms of flow but of pulses consistent with the existence of temporary operation enabling centers.

In addition, the future capabilities of anticipation concerning the logistic requirements of the combat elements should undergo considerable improvements and the logistics estimate is not to be based any more on estimated graphs but on really measured levels of consumption within the framework of effective modeling or, in the worst case, on calculated extrapolations during action. Finally, the improvement of the navigation systems, of the logistic means mobility, and of the maneuver space management, allow foreseeing a significant enhancing of meeting procedures that would limit to a strict minimum the transfer of cargo that seriously hampers transportation capabilities.
All in all, the reasons which call for aligning the three vectors determining the operational field on a same theater will probably not to say

immediately disappear, but at least reach a lesser intensity so that they will be no more insurmountable by the 15 years to come.

From then on, the field of the possible maneuvers will be more open due to the double effect of both relative gaps in the battlefield, and the possibility to set up temporary operation enabling centers able to support the tactical action for its duration. The operational or theater level will have again , through a real capability of logistic maneuvering, the capacity of enhancing the output of these tactical means outside the strict achievement of favorable force ratio. Being stronger has never been a waste but the necessity of being stronger anywhere at any time was ending in paralysis. That kind of polarization which was dominating the operational field, by magnetizing the opposing forces along an extended axis leading to a frontal battle, could possibly be replaced in the near future by the subtleties of marches and lateral sidestepping moves, even in the rear areas.
Once more, the comments of general Eisenhower stating that his G2 was telling him what to do, his G3 what was possible, but his G4 what was really feasible, will be thus confirmed. However, by now, while opening those new perspectives, the logistician is to show as promoting new solutions and not as censoring imagination. It remains desirable that imagination and character come back to power among tacticians and that this discipline attracts again those talented men it deserves, but that is another story.

1 The ″operation enabling center″ wording is preferred to ″supply base″ because it indicates better that the maneuver flows from its level.

From SEDAN to the MARNE

river, some good lessons, badly applied...

That French army, said to be invincible during the second empire, collapsed during only two engagements under the rush of the Prussian army organized and led by Moltke, inspired by Clausewitz's principles. Being too confident, the French army, trained by the successful campaigns in Crimea and Italy and also by the colonial ventures, did not know how to take advantage from the technological progress of that time and how to adapt its employment doctrine neither to the threats nor to the weapons' capabilities of that time.

By Colonel Thierry MAES, head of the CDES/CEREX

Although not prepared by his education, Napoleon III wanted to personally exercise the supreme command of the armies and his successive war ministers did not know or dare how to imagine a rational organization of the forces. A corrupted conscription system was giving the armies only poor elements. Finally some taste for luxury and small wages were leading the officers to fight for promotions with all the compromises and retreats that can be imagined. Living apart from the country, cherished by the power and carried away by its victories outside the borders, the army was in fact vegetating in an atmosphere unfit for progress.

As the chronicle for an announced defeat, the improvisation of the campaign in Crimea and Italy was already announcing Metz and Sedan. From Gallipolis, Saint Arnaud, the war minister, was complaining to the emperor : " *We have not complete the setting up of our forces..., we only have twenty four horse drawn guns..., it is not clever going to war without bread, shoes, cooking pots or cans...*". In 1859 the emperor himself was writing from Alexandria to his minister :" *We gathered a 120 000 men strong army before having set up the supplies. This is the contrary of what is generally done*".
In this context, it is easy to understand that, after the victory of the French army during the imperial campaigns, it was important, especially in 1870, that no spats button be lacking ! For the rest, as usual, one will do its best according to this very French principle, already sufficient at that time to win the battle... While the army of Napoleon III was teaching contempt for what Germany was

doing, Moltke was continuously improving the army of his country in strength and quality of its equipment, and through doctrinal thinking and staff's works. He was the one who succeeded in taking advantage of the lessons of the wars of the empire (the first one) and in transforming in facts the principles taught by Clausewitz the Prussian, notably that of fires' concentration.

To the German strategic deployment in several armies, each one tasked with a specific role in the offensive action, was opposed a line of troops stretched over almost 240 km, without any disposition in the depth or reserves, and above all, without maneuvering spirit. A few weeks were enough to establish the incompetence of the French imperial army. If the inferiority of its artillery is not to be regarded as the main cause of its defeat, and although the Chassepot rifle provided it an undisputable advantage over its German adversary, the French army was mainly not able either to have the equipment in line with the technical innovations of the moment or to finalize a coherent doctrine to federate spirits and energies. But it is generally from the first ones that we can build up the second one. And at that time, the period was open to it.

After the 1870 disaster the government was going to draw the lessons of the failure of its army. From the three main laws that marked the army reorganization and led it up to the Marne, we will here retain the technical improvements which gave it the firepower that was then bitterly lacking : smokeless powder, rapid firing rifle, 75 mm gun and gelignite shells are some of the

essential elements of the French army's renewal and through this latter, the doctrine, which prepared it for the great war. After some period of time that we can call "*reaction time*" when the army organized itself for a defense strategy marked in the field by the disposition conceived by General Séré de Rivières, the progress of the armament progressively led to the come back of offensive spirit, to the concentration of efforts' principle and to superiority of fire.

If the 1875 field manual about maneuver had stressed the preponderance of fire, from now on "*offensive will be fire moving on*". "*Only offensive makes possible to obtain decisive results*" could be read between the lines in the writings of men such as Foch, Pétain, Grandmaison. By multiplying by two the speed of the projectiles, the colloidal powders called "*smokeless*", developed by Paul Vieille, a powder engineer, gave a lead to the French army by providing it with an undisputable fire superiority.

The Lebel rifle, which equipped the infantry as of 1886 was the first automatic weapon using this smokeless powder. Manufactured at a rate of 3 000 a day, it is, in the French industrial history, the first example of mass production. This rifle gave to infantry an additional capability that placed it among the most formidable of that time. The high rate of production permitted its rapid fielding into the forces. In the same time, artillery never ended improving its equipment with the bronze Reffye gun (1873) loaded by the breech, the first steel gun (1875), the 80 and 90 mm Bange systems, and also improving range and accuracy with the 120 and 155 mm siege guns. Its huge lead occurred in 1893 with the 75mm gun, the first production of a rapid firing piece of ordnance with an hydro pneumatic brake and an indirect aiming. "*Good for everything*" "*the 75mm gun is God the father, God the Son and God the Holy Spirit*" was taught at that time in the high studies centre !

Bibliography :
•*General Weygand : History of the French army - Flammarion 1961.*
•*J. Carpentier : The technical progress and the issue of the land battles - Revue scientifique et technique de la défense N° 55 - mars 2002.*

If Germany had already in 1870 a device for the variable adjustment of the shell burst, while France only had one for triggering the burst at two fixed distances, the lethal power of the French shell was considerably increased by its gelignite load. This explosive also increased its destructive action on the defense works and progressively led to the use of concrete. From these technical innovations regarding both fire power and easy delivery progressively resulted in a return to the offensive spirit. Already appearing in the 1887 field manual about operations, it was going to be the leading concept until the beginning of the great war.

We were thus renewing with Napoleon (the Great) and Clausewitz. To the point that some fundamental truths, well known from experience, were to be forgotten. "*The best security is ensured through a full attack, the energy in the execution makes for all the weaknesses and compensates for all the mistakes*" was stating Lieutenant-colonel de Grandmaison, then G3 of the armed forces staff, during his famous lectures. The excess of offensive spirit was going to lead to the all-out offensive. Therefore doctrine had well appropriated this technical progress and seemed to be ready to take advantage of it.

But, as written by Colonel Petain, this should not to be done "*against the experience of war*". But the 1884 field manual about maneuver was teaching the contrary. By condemning the use of terrain and of covers, by advising all-out offensive, by too much relying on the value of the French soldier without providing him with an organization and operating modes consistent with the fielded weapons, and which were progressively acquired by the conventional enemy of that time, the French command had demonstrated that, in fact, it was not able to take the best advantage from the armament progress, notably in artillery. When to these factors, you add the refusal to acquire heavy artillery (five regiments pending equipment with old 120, 155 and 220 mm guns hastily modernized in July 1894), the quasi ignorance of progress in cars and aircraft, you can guess that the French army was from the start placed in a difficult position against a more sound and pragmatic Germany which rapidly knew how to transform its 77 mm gun into a rapid firing gun, how to field the 105 howitzer and the 150 heavy howitzer and how to reverse the situation to its advantage.

By wrongly applying a right principle and despite the wisdom and the balance of the supreme commander, General Joffre, convinced "to set up the reasonable bases for an offensive doctrine", the French army was to dearly pay on the battlefield during August 1914 for the perverse misuse of the offensive doctrine and for its subsequent shortage in equipment. It is once again the bravery of the French soldiers that saved France by facilitating the restoration of the disposition of our forces on the Marne river and the following successful counter-attack...

A synthesis of the study
about the evolution of major units CPs

ONE PRELIMINARY REMARK FROM THE CEREX :

This study, the synthesis of which is presented below, will have a special distribution from the CDES, research and documentation center. It has been forwarded in June 2003 to the Army COS and to the force commanders. Conducted on request of the general commanding the CDES, in order to clarify the current studies, it sums up the evolution of the French major units CPs during the last 60 years (at division and brigade levels), by comparing, whenever possible, the French solutions with those selected by Allied major units. It brings an historical view preliminary to the reflections that will be carried out on the command and control function of the future Army.

BY GENERAL (RETIRED) Patrick **GARREAU**

The CPs' history of our major units over the last sixty years undoubtedly makes possible to bring three main lights that are preliminary to further studies.

The current processes to define the " *operative level* ", intended to act with the same forces in high or low intensity engagements, and to develop a multinational culture are really new. On those points the past only shows that the French spirit is able to accept some constraints but that our culture also remains the basis of our military efficiency.

The principle of modularity is today superimposed on the historical divisionary principle and contradicts some of its cornerstones as far as logistics and war-to-peace continuity are concerned ; this is the mark of a rupture or of one step in our military history, even if the divisionary principle is not a "*warfare principle*" and might be subject to a new formulation. The term of re-foundation really corresponds to the experienced realities.

The present analysis of the operational functions of a CP has a coherence that clearly meets historical lessons : all these functions already existed in 1944.

However, a rule should not be drawn from the example of previous CPs to determine the level at which all these functions should exist, or to determine the level at which the activity takes place in the conception-planning process or when considering the " *conduct-implementation* ".

However, there has been a decentralization move towards subordinate CPs in the preparation of high intensity warfare, and a reverse trend in some low intensity crises. Tactical reasons exist, maybe also reluctances when faced to subsidiarity.

The technical evolution of the " *Signals* " function has always had a direct impact on the organization of CPs, but the present acceleration in technological jumps is unprecedented. The US *Army* has continuously carried out the study pertaining to the distribution of functions and tasks between the division and brigade CPs. This has been the case in France up till 1967, with fortunate solutions.

The Americans and the French, due to their military traditions, have also had a different conception of the balance between the command and control function of a CP and the other functions. The modularity may lead to a new vision of this balance.

Last, some French CPs have also carried out in wartime some functions and tasks not listed in our regulations and presented some

Gilles Zindy/CDES

CP (AURIGE exercise)

examples of responsibilities-taking in the fields of doctrine, training and of diffusion of lessons learnt.

As regards the smooth running of CPs, our history can also lead to some observations.

The limitation in CP 's manning and of its support can have some similarities with searching for productivity but has often entailed an exaggerated tiredness and a degradation of the operational efficiency. Certainly, one must always first come back to the definition of the functions to be carried out by each CP before designing its required organization. Obviously, we are now on this track.

If the present modularity imposes more homogeneity within CPs, more support for doctrine, regulations and standardized procedures, it is really in accordance with the extension of efforts, sometimes irregular, but always deemed to be necessary and can make up for the lack of peace-to-war continuity within groups essentially composed of officers and NCOs, and set up around " *nucleus* " identified during peacetime.

Lastly, the CP cohesion has always been based on human factors such as the confidence inspired by a commander or that created through training. This cohesion, also linked to the " national " nature of a staff (or with a leading nation), also allows to tackle unplanned but necessary functions in a specific crisis.

As far as the rest is concerned, our recent military past really shows that our Army has already had to and been able to reorganize itself according to new doctrinal and structuring foundations. Some training periods have been necessary but convincing results have always been obtained... as those achieved today when comparing to the beginning of this re-foundation.

Experience feedback :

a management system

for major decision makers

Being able to draw out lessons learned from past conflicts or from operations in order to prepare for future ones, is a real state-of-the-art military exercise of today, more than ever at the heart of the CHOD 'concerns, as the military advisor to the government and as the operational commander of the forces.

by (Navy) Captain Pierre-Yves Le BAIL, Armed Forces Joint Staff/OPS DIVISION deputy commander

However, this exercise is not new. It had already allowed our defense tool to evolve by adapting it to the new world geostrategic deal, to improve its organization and capabilities as well as our forces' equipment.

In short, without intending to analyze the last conflicts, some major conclusions could profitably be drawn out of them : the Falklands war pointed out the need for the control of air-sea areas as a prerequisite to land operations ; the Gulf war pointed out the preponderance of air operations, the increased role for intelligence and the weight of the technological factor ; the Balkan operations pointed out the requirement to have a mandate and an accurate military objective to effectively enforce peace.

Moreover, the world geo-strategic evolution changed the equation for the international resolution of crises. With the end of the cold war, the UNO, created in 1945 in the aftermath of the second world war, gradually have again an humanitarian dimension, granted by its charter, thus enabling it to decide sanctions against countries that do not comply with international law, as well as to play its role of crises regulator through the Security Council, and to resort to the armed force if necessary. As for NATO born in 1949 out of the East-West blocks confrontation, it had to adapt its command and force structures to meet the new threats, for which it was not designed originally.

The international commitment of our armed forces has become obvious.

They more and more take part in contingency coalitions. Moreover, on this background, the European Union Security and Defense is building up, a nascent counterweight to the United States of America, today super-power without any rival.

Lessons learned from the latest conflicts, in which France took part, was rich and enabled it to favor some essential military capabilities : projection assets, logistics of committed forces, C3R1 capabilities. And owing to the multinational framework within which our forces operate, interoperability has become a leitmotiv.

Since ten years, many decisions resulting from lessons learned have been made as well in the organization level as as for force equipment. The Gulf war and the early operations in Bosnia - revealing the difficulties to adapt the draft system to force projection - started the process for all-volunteer armed forces. Bodies with a purpose for strategic planning and perspective were created at that time : the DAS (Strategic studies Directorate) and the DRM (*Directorate of Military Intelligence*) in 1992, the EMIA (*Joint Planning Staff*) in 1993. It was the same at forces level, which adopted the modularity concept by tailoring task forces from modules of military assets : the land action force

(FAT), the Naval Action Force (FAN) and the TAF (*Tactical Air Force*).

Very recently, in 2002, a strategic planning center was created in the heart of the SOD Saint-Germain islet : the JOC (*Joint Operational Center*) - by incorporating the JPS (*Joint Planning Staff*) capabilities - is gradually transformed into an Operations Planning and Conduct Center (CPCO)[2], the JPS (*Joint Planning Staff*) becoming the Joint Forces and Training Headquarters (EMFEIA)[3] by sheltering the CP for the operative level of forces.

New concepts appeared, such as "*survivability*"- to take only one example. Fighting systems against combat damages have been reinforced in all areas. Search & Rescue means for pilots crashed in enemy territory (CSAR[4]) have also been developed. Electromagnetic stealth ness and anti-missile self-protection by jamming - chaff have still been made more efficient.

A RECENT WILL

So, if headquarters have generally drawn lessons from passed conflicts, on the contrary it is in the implementation of lessons learned that we find difficulties.

First of all, it is not always possible to make use of them. Indeed, each conflict often appears as a specific case. Furthermore, practical fields of application do not necessarily exist. Eventually, the capability to act is often limited by budgetary constraints, even if the intellectual analysis proves to be right.

Thus, the experience feed-back difficulties come neither from the analysis of collected information nor from lessons learned - whatever they are, good or bad - but from their implementation that sometimes goes unheeded in some very crucial fields.

Thus, all these problems led the Joint Staff/ operations division (EMA/EMPLOI) to reconsider a more powerful lessons learned system (RETEX), both adapted to the new all-volunteer dimension of our armed forces and taking into account - at strategic level - the new joint and multinational dimensions for planning and conducting the military operations decided by the government.

Relying on the joint evaluation process (DIE) created in 1994,

the Joint Staff/ operations division formalized the RETEX process into a Directive[5] during year 2000. A group of correspondents is permanently collecting data from current theatres of operations and from exercises. When processing them, we carry out a thorough analysis leading to the validation of strategic teachings and to decision-making at CHOD level.

Difficulties are at several levels. On the one hand, at the level of the information sensors : today, RETEX teams are still lacking manpower to bring in all useful data. In France, it is necessary to develop a true RETEX culture, similar to the intelligence one, by taking as an example the Anglo-Saxon countries. Lessons learned (RETEX) are an iterative loop, which must be an integral part of our modern Command and Control methods.

In addition, at the level of concrete measures taking : the reasons are often related to the lack of budget allocation, but also to the deficiency of the transmission chain and on a bad administrative management towards decisional authorities to modify

equipment, programs and training. Hence, the creation of recurring discrepancies and gaps between the Military Programming Act practice and the theory of defense White Papers.

A NETWORK ORGANIZATION

At joint and allied levels, the Joint Staff/ operations division monitors the RETEX function in close cooperation with the three services and the joint organizations or directorates. Operational readiness improvements concerning interoperability at joint and combined levels has become a key point of the RETEX process.

Consequently, the RETEX process requires - at organic and joint/allied levels - a permanent, effective and coherent organization including trained officers and NCOs having a good operational experience in order to make sure of the quality of results.

This organization primarily relies on a network of well identified RETEX experts, in which the responsibilities of the Joint Staff, of each Service and of joint organizations are well defined,

then on the activation of assessment teams for any commitment or exercise, but also on the existence of a joint assessment committee (CIE) responsible for training validation and measures to be taken, and of a standing assessment group (GPE) responsible for the follow-up of the decided measures, finally on the use of a common data base, whose characteristics are adapted to requirements.

The efficiency of the RETEX process primarily relies on the capability to put forward corrective measures to be implemented during and after an operation. Considered measures can relate to a problem or an identified dysfunction at a conceptual, doctrinal and procedural level or to a problem of equipment or of one piece of equipment, which can only be solved by specific actions being aware :

- that a new difficulty is taken into account only after validation and after comparing it with those previously identified ;

- that a dysfunction is taken into account by the Joint Staff only if it concerns the CHOD responsibility.

The results of the RETEX process have to be distributed to headquarters and units, in order to take them into account during the planning and building -up stages for a forthcoming crisis.

A documentation data base will support it. The goal is simple : headquarters to use this process as easily and as transparently as possible. Speed and simplicity should characterize the access conditions to the required information. This data bank will enable the lessons learned cell of each staff to get identical data about an issue and to exchange information. In the future, the goal is to have a similar access to similar information on a given subject for everyone, wherever you are, at the Joint Staff or in the various headquarters.

1 C3R : Command, Control, Communication and Information.
2 CPCO : Operation Planning and Command and Control Center.
3 EMFEIA : Joint Forces and Training Headquarters.
4 CSAR : Combat Search and Rescue.
5 Instruction 14000, July 25, 2000.

TOWARDS A TRUE CULTURE

It is now necessary to go further in the way of the RETEX process and to set up this one as a true culture, comparable with what the United States and the United Kingdom are doing today. The approach is double. On the one hand, at national level, to formalize this process between the Joint Staff and each Service, Directorate and Department in the form of a memorandum. On the other hand, at international level, to develop a co-operation with our European and American allies.

Indeed, this latter one will permit to provide and confront ideas, to transfer experience and know-how as well as to improve our methodology. The Joint Staff/operations division is responsible for the coordination of this collaboration within the SOD (Secretary of Defense) at joint level.

Army staffs have already set up close contacts with their counterparts. The annual seminar is the preferential place to improve the exchange of information within the RETEX network concerning lessons learned by our allies.
These exchanges should be continued and developed with the similar organizations of other countries. They will reinforce multinationality and facilitate the setting up of an European defense.

Lessons learned

The US digitization in Afghanistan

At the end of the 1991 Gulf war, the United States of America estimated that having the informational superiority would be decisive to win the next wars and they gradually developed a command and control concept based on the organization of a global information system which is today currently called battlefield digitization. The Americans have recently been able to test during combat operations, in Afghanistan, the new information systems, even if their organization is still far away from the fixed conceptual objective.

During the operation Enduring Freedom, the US Marine Corps has been chosen to enter first in Afghanistan and it deployed at Camp Rhino and Kandahar, places located at more than 1000 km from their departure bases, i.e. the US Navy ships. This deployment constituted a real trial for the C4 system (Command, Control, Communications and Computer) for several reasons : a very long distance from the deployment area of the Navy ships, the great dispersion of the units on the ground, and the lack of modern infrastructure of communications in Afghanistan.

BY CDES/CEREX

THE DEPLOYMENT OF THE "JOINT TASK FORCE ENABLER"

The first disembarked units were provided with single channel HF radio sets and UHF satellite communications systems as well as with a satellite communication suitcase connected to the SIPRNET Internet network, secret classified, a component of the Defense information network - DISN (*Defense Information Systems Network*). The *US Marine Corps* doctrine plans for the progressive and fast reinforcement of these means until their replacement by the *Joint Task force Enabler*, a disembarked system fitted on 4 Humwee vehicles and having the same capabilities as those existing on board of the transportations ships.

The *Joint Task force Enabler* makes it possible to connect to three networks : NIPRNET DISN networks (Restricted.), SIPRNET (secret) and JWCS (top secret) ; and furthermore provides secure voice communications. It includes an SHF antenna, three servers/routers, two power generating units and a commutation panel. Manned by 15 people, its installation time is 12 hours.

In this case, the deployment distance was far over the 350 km envisaged by the doctrine and consequently the use of C-130 for air transportation had to be excluded. The *Joint Task force Enabler* transportation had thus to be carried out by the MEU (*Marine Expeditionary Unit*) helicopters - (CH-53 *Sea Stallion* and CH-46 *Sea Knight*).
In addition to the constraint created by the weight of the Humwee vehicles and the freight size, this transportation required the establishment of intermediate refueling bases. These logistical conditions have thus extended the duration of the equipment delivery. Thereafter, a flow of replacement parts had to be set up because the MEU were committed largely beyond the 15 days prescribed by the employment doctrine and the equipment was taken over by the *Army* that came to relieve the *Marine Corps*.

Although the broad band connections worked without any major problem, on the other hand the UHF tactical connections suffered from the atmospheric phenomenon known as scintillation, which, at night, caused during several hours the break up of the UHF connections. Consequently, the command structure had to adapt the planning and conduct

of the tactical missions. Nevertheless the permanent liaison with higher echelons was always ensured thanks to the Joint Task force Enabler which was not affected by this phenomenon.

LESSONS LEARNED

The *Joint Task force Enabler* network has become a major communication asset for the chain of command.
At tactical level, thanks to its performing capabilities and to the various information systems integration, it allows an immediate access to data that previously came through various means and with sometimes too long delays (local or national databases, cartographic and photographic imagery). It facilitates in particular the development of the

decision-making process by reducing the time dedicated to analysis and synthesis. It also offers a conversation forum to commanders placed at the different command levels, it also simplifies command communications to such a degree that SIPRNET has become the major command and control means between tactical units, thus establishing the quick abandon of voice communications. However, in the signals field, the two major connections, tactical UHF and HF, are still too dependent on satellite communication systems. On the one hand, the lack of modern communications infrastructure in Afghanistan excluded the possibility of a local support alternative.

In addition, the choice not to deploy FH means, even if it is constraining at tactical level (signals maneuver, importance of the means, protection of the sites) deprived the force from liaisons which would not have been disturbed by the atmospheric phenomena.

In conclusion, the adoption of this network demonstrates its beneficial effects in terms of information and assistance to commanders but it demonstrates also its weakness since it is still difficult and sometimes imprudent to free oneself from the use of mobile tactical links and communications means. Regarding the logistical constraints, they have not disappeared, but they have new aspects.

The desirable contribution

of lessons learned to the **future land action** study

The CEREX, acting on two grounds , participates in the studies related to doctrine : first by bringing the lessons learnt from passed and ongoing engagements, i.e. experience feedback, the RETEX, and then by checking the implementation of doctrine during major units exercises, i.e. the after action review and analysis.

As far as the study of the "future land action" "ATF" in French is concerned, which deals with the new tactical perspectives offered by the technological enhancements of the CIS systems and of future weapons and equipments, the CEREX participation has an additional reason which is that of drawing orientations concerning the new objectives for research and assessment.

The ATF study concerns a land force component at brigade level and essentially pertains to three fields linked to the contribution of new technologies. First, the consequences for the operational "command and control" function of the implementation of operational information systems that are more effective ; then the implementation of new weapon systems and last the management of the psychological environment.

BY LIEUTENANT-COLONEL **WINCKLER,** FROM THE EXPERIENCE FEEDBACK CENTER (CEREX) OF THE **CDES**

In each of these domains what can be drawn from lessons learnt and after action reviews ?
The lessons learnt drawn from ongoing conflicts are rich in terms of doctrine lessons likely to improve the operational capabilities of the *Army* and to determine the needs as far as equipment and training of land forces are concerned.

The new technologies at their present stage of development already equip our forces and can therefore become part of a first assessment both in operations and during major units exercises : our operational centers use various operational information systems whether in former-Yugoslavia or during brigade ops centers' training exercises at Mailly.

BATTLE SPACE DIGITIZATION AND FACILITATION OF THE DECISION-TAKING PROCESS

First of all, it is in the information management field that changes are expected. In fact, digitization must be used for the acquisition, the recording and the dissemination of information with the aim of enabling all involved parties in an operation to have a common perception of the situation. Then, as far as drafting and execution of orders are concerned, it must allow, thanks to simulation and situation monitoring, to provide an aid to command and control The use of new IO systems within Ops Centers is permanent, and new improvements are permanently enhancing them during exercises carried out at the CP training center at Mailly, thanks to the use of the forces information and communications system (SICF). Graphic space representations of the situation through projections and databases updates accessible to everyone, are easing the co-operative work, whether at relieve time between shifts for situation updates or during the decision-making process to make possible the analysis phases. Nevertheless, information management remains a weak point in the running of OPS Centers. In fact the faced risk is that of over-information. This latter may appear in various forms such as the absence of reaction to messages from addressees that are no longer able to sort out a huge amount of mail or the impossibility to extract one piece of up-to-date information from databases that are not correctly updated.

What should have a determining effect on the running of CPs is the networking of all the OISs that are to be fielded within the forces : SICF of the force, Information system at battalion level (SIR) and at terminal level (SIT). In fact presently, a lot of time is still dedicated to data input in order to ensure the monitoring of the tactical situation and the updating of documentary databases and a great number of staff officers are assigned to those tasks. The automatic data update, that digitization should make possible, will lead to save a significant time and will enable staff officers from the various operational functions to make a more

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The Army Lessons Learned process in contact with realities must permit the adaptation of forces'know-how during operations to the future land action.

thorough contribution and to have more initiative.

The multinational context, which is now the normal employment framework of forces in operations, requires interoperability between our OISs[1] and that of our allies. This is already possible thanks to the implementation of protocols such as the *Multilateral interoperability program (MIP)*. The possibility of working in a multinational environment also requires the employment of standardized procedures. A significant effort has been undertaken at European level within

NATO and staff officers are now familiar with the electronic mail system and with the structure of orders.

Therefore, lessons learnt and the after action review processes should enable the "*command and control*" function to accompany the evolution linked to the implementation of new operational information systems thanks to the analysis of various specific fields among which :

-Mastering of information : more particularly the possibility to obtain the representation of one unique reference operational situation ;

network update and sharing of operational databases ;
- Decision-making process : co-operative work, facilitated by the use of computer aided decision-taking tools such as simulation ;
- Interoperability ;
- Standardization of procedures.

IMPROVED OPERATIONAL FUNCTIONS

The ATF study is also interested, beyond the implementation of operational information systems in future equipment and weapons, in the necessary evolution of the employment doctrine within the various operational

functions among which intelligence, contact battle and logistics. To strike fast and far when and as wanted with an operational logistics fully integrated into the maneuver, this is the objective. The lessons learnt and the after action review processes are able to provide an inventory assessment in these fields, and also to monitor and validate the ongoing evolutions and to establish some tracks in order to assess the requirements.

INTELLIGENCE

The main difficulty in the resolution of conflicts lies in grasping the threat.

Today, intelligence appears in different forms whether tactical, situation or environment intelligence are concerned, it deals with the political, economical and military appreciation of the situation. The result of this is that the sensors are not only those of the force, whether technical or human, but those of other players present on the theater of operations : medias, NGOs, foreign armed forces, host nation. It will therefore be necessary to ensure a convergence of information by opening the network to the various organizations likely to collaborate in the apprehension of

the threat. The present situation is not satisfactory. Besides the already existing partitioning within the intelligence community, it is worsened by the often-noticed impossibility of database interconnection. The accomplished work is from then on often incomplete, redundant and lacks some coherence. However, in the field, the investigation assets and contact intelligence are still insufficiently coordinated. Therefore, beyond the contribution represented by the new sensors which implementation is announced (robots, drones and imagery), studies are ongoing to solve these issues. As far as the common sharing of intelligence originating from different sources is concerned, a new architecture of the OISs, named *"Air-land Intelligence and Observation System AIOS"* is under development.

Concerning the improvement of contact intelligence gathering, the organization of the intelligence research units based on the *"Intelligence Surveillance Target Acquisition Reconnaissance, ISTAR"* concept should improve its organization.

CONTACT BATTLE

Will the real innovation come from new weapons and especially from the new offered striking capabilities ? It is already possible to have an assessment about some of them. The Leclerc, for example has already been tested : its mobility was tested as soon as 1999 during its deployment in Kosovo and its firepower in 2002 during the armored exercise of the 2nd Armored Brigade in Bulgaria. But the capability to strike hard, fast and far must be accompanied by the establishment of an innovation spirit that must run the brigade OPS Center. Some new applications that are similar to those studied for the future land action in order to increase the reaction speed and to gain surprise when facing an opponent, and permitting to strike it when and as we want in the contact battle have already been noted. Let's quote for example as a concrete case search operations in towns or in built-up areas objectives, that of the multinational brigade north² which, in order to avoid preliminary reconnaissance likely to alert, has used image and map video taps in three dimensions in order to enable the subor-dinated battalions to carry out the rehearsal of scenarios and the learning of courses of action.

OPERATIONAL LOGISTICS

In the future the monitoring tasks pertaining to the logistics situation could be significantly lightened thanks to digitization, as it may be felt through the implementation of the SILCENT procedure, which is now running well and allowing to localize, in an automated manner and at any moment, the location of any piece of equipment during its projection thanks to the bar code given to it.

Thus, the officers of the operational logistics cell, free from monitoring tasks, will now be able to play a more active role within the Ops Center, in anticipating the maneuver and the conduct of logistics operations.

Changes in operational functions linked to the implementation of new technologies can therefore be tracked thanks to lessons learnt and after action reviews and permit the doctrine evolution that is already applicable to :
- intelligence : concerning the integration of tactical, situation and environment intelligence and for the coordination of contact intelligence.

- contact battle : by analyzing the innovation spirit likely to create surprise.

- Operational logistics : by tracking the consequences of the lightening of situation monitoring tasks and of the increased capabilities in the anticipation and conduct of the operations.

THE REAL CHALLENGE : TO CONDUCT AND WIN THE INFORMATION SUPERIORITY

Today the Army has reached the end of a re-foundation process that has turned it into a projection professional *Army*. The ATF is the continuation of this evolution, with the perspective of exploiting new information techniques and the subsequent operational superiority.

This superiority is gained thanks to moral influence over the enemy, from the awareness acquired by the land force of its own superiority and from the management of the psychological environment the objective of which is to win the hearts and spirits.
It is the case of winning the day over the opponent thanks to the troops morale, the support of the local and international public opinion, the dissension and doubt spread in the opposite camp.
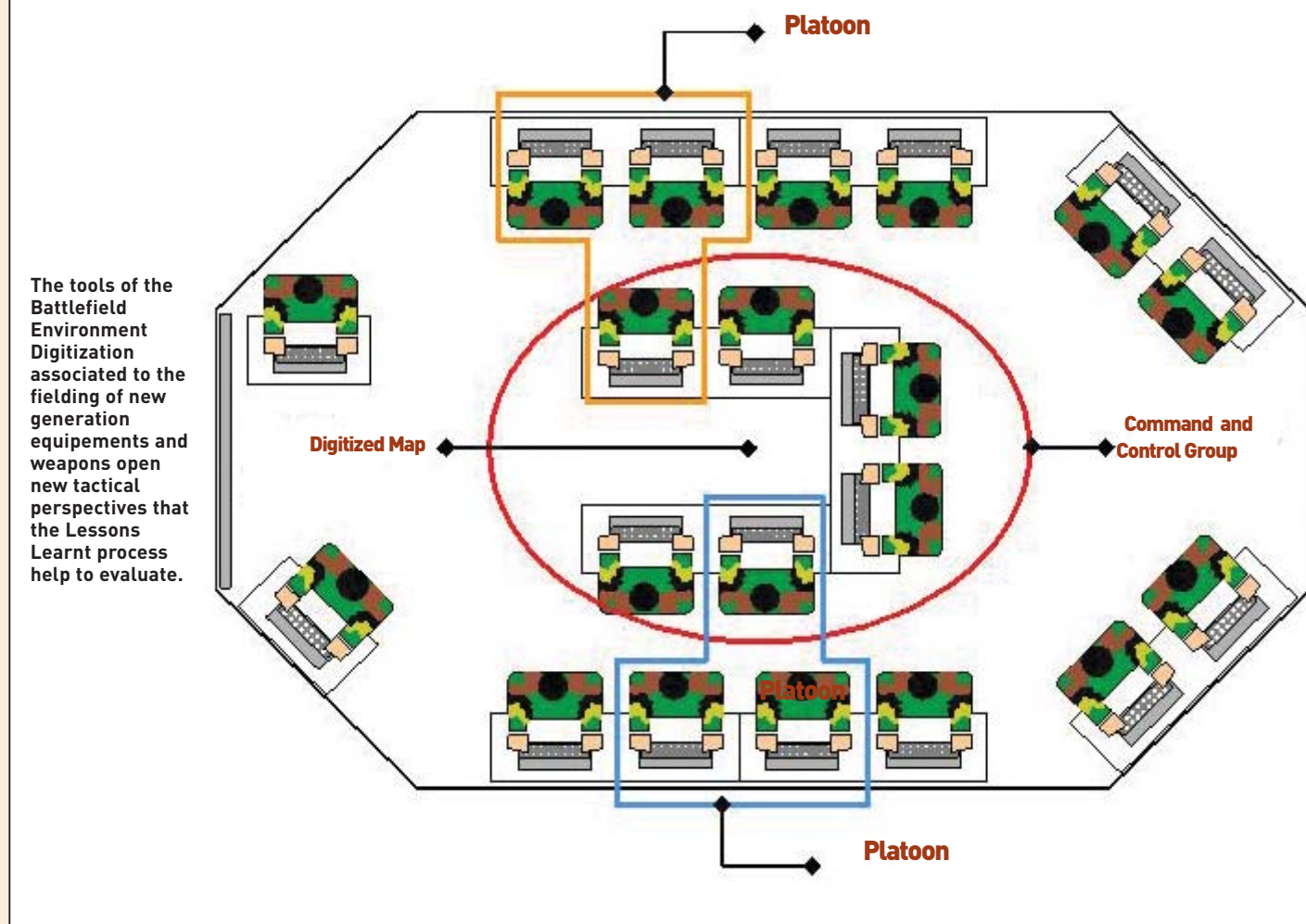
ENSURING THE MORALE OF OUR OWN TROOPS

Above all, it is through a greater cohesion that are expressed the results of the acquired advantage linked to professionalization and also the ability to understand the spirit of the mission that now lies within our troops. Our professional soldiers are now very well trained to the most varied theaters, the loss of cohesion due to the division of battalions subject to the modular forces generation process is compensated by the fact that elementary units from the various branches are used to maneuver together within the brigade which has now become the melting pot inside which the combined arms integration is achieved.

The self-confidence necessary to a good behavior of our soldiers on the ground also comes from their professionalism. In this field we must maintain the same effort on permanent individual technical training of the various levels : at basic level for example, a gun shooter must know how to shoot or else at NCO of officer level, an intelligence analyst must have a prior training adapted to the theater. The effort must mainly be made on combined arms technical knowledge. In fact, today more than ever, an effective combined arms cooperation is necessary up to taskforce i.e. battalion, sub-taskforce i.e. company. In order to evaluate the training level of infantry and armored units, the *Army* has a first rate tool which is the tactical training center

FUTURE LAND ACTION OPERATIONS CENTER WORKING METHOD

Platoon

Command and Control Group

Digitized Map

Platoon

Platoon

The tools of the Battlefield Environment Digitization associated to the fielding of new generation equipements and weapons open new tactical perspectives that the Lessons Learnt process help to evaluate.

at Mailly, the CENTAC. There, thanks to the simulation assets, units' commanders are confronted to the reality of the combined arms maneuver at their level. The synthesis of the lessons learnt during 2002 show the wide variety of points that should be improved, but also of those that have been improved for the training of officers and NCOs in this area.

MANAGING THE PSYCHOLOGICAL ENVIRONMENT

But the good behavior to obtain is that of troops vis-à-vis the population and the

opposing forces. This behavior will be decisive during the theater entry or during the end of the crisis. From the manner in which the force will be perceived will depend the way in which its action will have legitimacy in the eyes of the local and international public opinion.

This action upon the environment will depend on the interaction of several operational functions : operational communication, civil-military cooperation and PSYOPS, in French local communication.

The management of the psychological environment defined in such a way is responding to a strategy initially fixed at a higher level than the one to which the future land action study is devoted i.e. the tactical one. Nevertheless, its implementation will be conducted at brigade level, which is the only one able, as in contact, to assess its effect in the field.

The psychological environment management is similar to deep operations. Similarly, it results from the capability to

plan and anticipate. Depending on the targeted audience, our own troops, the allied troops, the belligerents, the population, the vector to be used will vary : internal communication, medias, direct communication to the population by means of pamphlets, local authorities. In most cases, it is a part of the " *targeting* " process. Insofar as a force at brigade level is led to act in an autonomous manner, it will have to be trained to plan and anticipate and be provided with the appropriate assets.

The implementation of these individual or collective know-hows must be controlled as in operations as during exercises and the lessons learnt and the review after action processes can participate in this by analyzing :
- the level of individual training of specialists and its adaptation to their position;
- the planning and anticipation capabilities within brigade Ops Centers for the management of the psychological environment, operational communication, CIMIC and PSYOPS.

lessons learned

The lessons learned and after action review processes which lead information upwards are similar to what is performed in industry during a market survey. Similarly to the quality approach that tries to determine the user's satisfaction, the Lessons Learnt Studies Center can confirm the needs perceived in face of the effects pursued on the ground. Modeling and simulation during exercises must allow to validate some envisaged solutions.

The future land action study approach is new if compared to the usual doctrinal cycle. Indeed, it is concerned with a land force model foreseeable in the year 2015.
In that way, it is similar to the Anglo-Saxons approach : the American Future Combat System and the British Emerging Army. However, the doctrinal cycle, which follows the changes of the French Army, fits in a semi-annual rhythm, which is the one coordinated by the Operational Studies Coordination Committee (COCOOPS).

The CEREX, which is closely associated to the doctrine development and to the studies carried out by the Army realisation and doctrine studies center (CREDAT) and also to major units exercises carried out by the Land Force Command along the same semi-annual rhythm. Nevertheless, its participation to the ATF study puts its action into perspective.

1 Interoperability definition according to TTA 206 : capability of several systems, units or organizations whose organization, doctrines, procedures, equipments and respective relationships allow a common help that render them capable of operating together.
2 Kosovo 10th mandate.

Dealing with past engagements, the CEREX can also bring lessons learnt of past conflicts ; in this field it works in cooperation with the Historical Department of the Armies.
By conducting the Future Land Action study, the CDES resolutely participates to the evolution of the Army towards new operational capabilities adapted to the implementation of major innovations in the field of information, command and control and armaments.

Participating in this process, the CEREX can bring a useful contribution, that of contact with terrain reality, that of operational experience. However, this contribution will be possible only if it is appropriately oriented in the Future Land Action perspective, notably that of gaining the operational superiority through information.

FLA : the pictures

FELIN - p. 14
Infantrymen, equipped with the Félin system, have already reached their positions...
STAT

Numérisation - p. 21
Training personnel ranges from individual to collecitve level.
Vincent BEGON/ECPAd

CIMIC - p. 35
... the aid to populations becomes one permanent factor of the commitments...
Thomas SAMSON/ECPAd

Char Leclerc - p. 14
... the "Leclerc" formations converge towards their objective...
Dominique VIOLA/ECPAd

Site internet
www.cdes.terre.defense.gouv.fr

Pour vous tenir informé de la mise en ligne sur ce site, adressez-nous votre adresse mail et recevez un guide de visite vous facilitant la première navigation.

On this site :

- **The French CDES (French command Army Doctrine and Higher Military education)** and its different components: presentation of the CDES as well as of the different agences which are part of it.
- **The documentary database:** doctrine documents about the French Army are grouped in this database.
- **The headlines of the French military doctrine:** it enables to get a first approach to the French military doctrine. This text encompasses doctrine basics, and thanks to hypertext links, it also enables to have access to the definitions of military terms and to deepen this approach.
- **Assets:** more than 150 technical sheets and a dozen videos pertaining to the French Army assets.

DOCTRINE